

Edwin

THE

Thomas

ELEMENTS

Note of the OF 16th *Regiment Foot.*

SURGERY.

March the

In which are contained

26th 1763

All the essential and necessary Principles of the
ART; with an Account of the Nature and
Treatment of Chirurgical Disorders, and a
Description of the Operations, Bandages, In-
struments, and Dressings, according to the
modern and most approved Practice.

Adapted to the Use of the CAMP and NAVY,
as well as of the Domestic SURGEON.

Illustrated with Twenty-five Copper-Plates.

By SAMUEL MIHLES, M. D.

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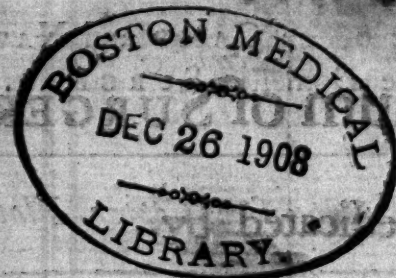
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Principal Secretary to His Majesty

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SAMUEL MITCHELL

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JOHN RANBY, Esq;

Principal SERJEANT-SURGEON
to His MAJESTY,

AND

Master of the Worshipful Company
of SURGEONS;

THIS

Compendium of SURGERY

Is dedicated by

His obedient,

humble Servant,

SAMUEL MIHLES.

TO
JOHN RANBY, Esq;

Principal Surgeon
to His Majesty

AND
Master of the Workhouse Company
of Surgeons

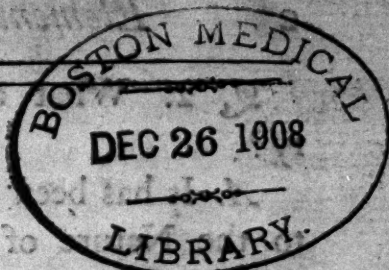
Compendium of Surgery

is dedicated by

His obedient

humble Servant

Samuel Mitchell



THE
ELEMENTS
OF
SURGERY.

Q. 1. **H**OW do you define the Art or Profession of Surgery?

A. Surgery is that most ancient and apparently useful Branch of Physic, which treats Disorders by *manual Operation*, (as the Word originally imports) assisted with *Instruments and topical Remedies*. But yet are we not to exclude the Use of internal Remedies, with a proper Regimen, &c. though these are more peculiarly the Province of the Physician and Apothecary, as Physic now stands divided into Three distinct Professions. The Surgeon is therefore esteemed the Physician's right Hand, and the Apothecary his Left, without which he cannot relieve distressed Nature.

Q. 2. What are the Parts of Surgery?

A. It has been usually divided, according to the Nature of the Operations, into the following Parts. 1. *Synthesis*, including the Conjunction of divided Parts, as in curing Wounds, Fractures, &c. 2. *Diæresis*, or the Division of Parts joined, as when the Fingers grow together, the opening of Abscesses, &c. 3. *Exæresis*, or the Extirpation of morbid Parts, as of foul Teeth, Cancers, Scirrhi, &c. 4. *Aphæresis*, or the Amputation of entire Parts, as of Fingers and Toes, Legs and Arms, Wens, &c. 5. *Diorthosis*, or the Rect-Apposition of Parts dislocated or deformed, as in Luxations, the wry Neck, &c. 6. *Prosthesis*, or the supplying lost Members and other Deficiencies by Instruments artificially contrived; as artificial Teeth, Eyes, Hands, &c. Which last is now the Business rather of the Instrument-Maker than the Surgeon. — Others divide Surgery more generally into, 1. the *Pentateuch*; (treating of Wounds, Fractures, Luxations, Tumors and Ulcers); 2. the *Operations*; and, 3. the *Bandages*.

Q. 3. What are the principal Instruments used in Surgery?

A. These

A. These are either for the Pocket, or to be kept in the Chest or Study. Among the former are the Case of Lancets, strait and crooked Scissors, (the latter called Probe-Scissors); a Pair of Forceps, a small Razor, a strait and crooked Bistoury or Scalpel, a strait double-edged Scalpel; Probes of several kinds, some grooved to direct the Incision-Knife, others with a triangular or globular Point, and a half Eye; a Spathula, strait and crooked Needles, a Salvatory or Plaster-Box, &c. Choice of which may be seen at the Shops of the most noted Instrument-Makers of *London* and *Paris*. (See the Figures of *Tab. I.*) The Instruments for the Chest or Study are much larger and more numerous; and therefore it will be more commodious to give the List of them under the respective Operations to which they belong. The Lancets should be kept clean and well set, neither too long or spear-pointed, nor too thin in the Blade; some of them forming an acute, and others a more obtuse Angle for Veins of different Depths and Sizes (*Tab. III.*) The Probe-Scissors are used to follow the Probe for enlarging the Openings of Abscesses, *Fistulæ*, &c. though in all Cases the Scissors ought to give way to

the use of the Scalpel where practicable, inasmuch as they give more Pain, and make a contused Wound by their pinching, in the division of soft parts.

Q. 4. What are the common Materials for Dressings in chirurgical Disorders, and after the Performance of Operations?

A. They are Lint made up into various Forms, Compresses or Bolsters, Plasters and Bandage. Even sometimes Compress and Bandage alone make the whole Apparatus, as in many simple Fractures, Luxations, &c.

Q. 5. What are the Uses of Lint?

A. Dry Lint is used, 1. as the most innocent Styptic to restrain the Hæmorrhage in recent Wounds; for which purpose it is likewise in larger Hæmorrhages dipt in some styptic Liquor, in Alcohol or in Oil of Turpentine heated, &c. 2. Another Use of Lint is to heal, or incarn or cicatrize clean Wounds, which it does by absorbing the Matter in them, and excluding the injurious Air. 3. It is used to dilate Wounds, and keep open their external Orifice, till the bottom is cleansed and healed; as also to compress and keep down fungous or proud Flesh, which retards the Cicatrization.

Q. 6.

Q. 6. In what Forms is Lint applied for these Purposes?

A. Sometimes it is applied in a flat or oval Shape, and then it is denominated a Pledget. (*Tab. II. fig. 1, 2.*) Sometimes it is convoluted into a cylindric or globular Form, and then it is termed a Dossil, (*ib. fig. 3, 4, 5.*) which is either applied loose, or secured round the middle with a thread (*ib. fig. 6, 7.*): but when Lint is tied very close together in a conical shape, it is then called a Tent (*ib. fig. 8, 9.*); which last is of late justly brought into disuse, as it irritates and renders the Lips of a Wound callous by its Hardness and Compressure, so as greatly to retard the Cure.

Q. 7. But are there no Cases in which the use of Tents may be allowed?

A. If they may be used any where, they may in Wounds of the Thorax or Abdomen, to stop up and keep open the Perforation, to give a Discharge to the confined Blood or Matter; and in this case the Tent should be only a bit of fine Rag or Lint rolled up into a Cone, with a downy Apex, and secured from slipping in by a thread fastened to its Basis. But if the Tent is designed to dilate

some narrow Opening, Abscess or Fistula, &c. where the Patient will not permit the Knife; it is then usually made of Sponge dipped in melted Wax, and kept compressed between two Plates till cold, when it is cut as to Size and Shape agreeable to the design. Thus the Warmth of the Parts softening the Wax, the Sponge by degrees swells and dilates the Opening.

Q. 8. What are the Materials and Uses of Compresses?

A. These are usually made of Linen folded together, and applied either dry or dipped in some Liquor, to make the Bandage and Splints sit easy and press effectually upon the Parts, also to retain the Dressings, and often the Parts themselves in their due Situation. When the Compress is to make a considerable Resistance, as in many Fractures and Luxations, it is often made of a piece of Emplaster folded together: sometimes a farthing Ball filled with saw-dust is used, to retain the Head of the Humerus, and a farthing itself is folded up in a bit of rag to compress after Arteriotomy in the Temples, &c. They are formed as to size and shape agreeable to the design and part which they are

are to invest. See the various Figures of them represented in *Tab. II. fig. a, b, c, d, e, f, &c.*

Q. 9. What are the Uses of Plasters in Dressings?

A. They serve to secure the Dressings or other Applications, to defend Wounds from the Air and other Injuries, to secure and retain the Fragments of a Bone; as also to ease, disperse or maturate in Tumors and Luxations, &c. Add to this their Use as a dry Suture, for retaining the Lips of a Wound together. They vary as to Figure like the Compresses before described, *Tab. II. fig. a, b, c, &c.*

Q. 10. What do you intend by Bandage?

A. That which usually makes the last important Article in every Dressing; and which consists of clean, old, but strong Linen, free from knots, hems or roughness, and cut to a proper length, breadth and shape, suitable to the disorder and part to be invested.

Q. 11. How many kinds of Bandages do you make?

B 4

A. Ban.

A. Bandages are either *common*, subservient to many Parts and Disorders; or *proper*, serving only for one Part or Disorder: and each of these are either *simple*, consisting of one entire piece; (*Tab. II. E, I, P.*) or *compound*, made up of several pieces sewed together, (*ib. C, D, R.*) The simple Bandage is again either equal and *annular*, going round the part like a ring, as in Issues, &c. (*ib. D, F.*) or unequal and *spiral*, where the turns of the Roller shift, by gradually ascending or descending upon the part, (*ib. H, N.*) This last or spiral Bandage is again subdivided into three kinds: (1.) The *deloire* or *spreading*, where the turns deviate in any degree, more or less, provided they remain contiguous, with their edges wrapping over each other, (*ib. F, H.*) (2.) *Rampant* or *creeping*, where the turns of the Roller recede from each other, so as to leave large or small spaces betwixt each round, (*Tab. S. fig. F, G.*) (3.) The *Reinversed*, which is when either of the former have the Bandage reinversed or twisted at each or every other turn, in order to make it fit tight upon the declivity of some Limb, as upon the Femur, Tibia, and Cubitus. These Bandages of the Roller-kind are said to be single or double-headed,

headed, as they are rolled up either at one or both ends, (*Tab. II. H, O.*)

Q. 12. What are the most simple surgical Disorders?

A. As the human Body is an Assemblage of Canals of various kinds, conveying respective Juices; the most simple Disorders that can happen to them, must be either an Obstruction, whence Tumors of all kinds; or a Solution of their Continuity, whence Wounds of all kinds. Fractures are a Species of Wounds in the harder Parts; Luxations are a Species of Tumors, and Ulcers are old cavernous Wounds.

Q. 13. What do you intend by a Tumor?

A. The Enlargement of any Part beyond its natural Dimensions; which is distinguished in a soft Part into inflammatory, dropical and emphysematous, according as the Vessels are distended either with red Blood, watery Lymph, or elastic Air; and these again are distinguished into cystic, where the Humours are collected into a sort of Bag; or scirrhus, where the Humours are dried and compacted into a hard Body. According to different Circumstances and Parts in which

which they are seated; Tumors are denominated either Phlegmon, Oedema, Erisipelas, Abscess, Gangrene, Sphacelus, Scirrhus, Cancer, white Swelling, Exostosis, Spina Ventosa, &c. of which we shall speak in order.

Q. 14. What is a *Phlegmon*?

A. A Phlegmon is an inflammatory Tumor from an Obstruction and Distension of the sanguiferous or first Order of Vessels, attended with Heat, pricking Pain, Tension or Resistance, and Pulsation or throbbing. The immediate Cause may be any Stimulus urging the Blood on faster than it can freely pass through the Anastomoses of the Arteries into the Veins, too great a Thickness of the Blood, or too great a Constriction or Diminution of the Diameters of the Vessels from any Cause. The Signs of this Tumor are burning Heat, from the violent Attrition of the Blood, which being obstructed in some Vessels, must necessarily run more swiftly through those that are pervious; and from the Attrition of the red Globules, betwixt the Contraction of the Artery and that of the Heart, by which they are in a manner drove backwards and forwards in the same Vessel.

Redness,

Redness, from a Distension of the small Vessels with Blood, which were before invisible, and from some of the red Parts being forced into the serous Arteries. Pain, from the great Distension of the nervous Fibres of the small Vessels which are ready to burst. Pulsation or Throbbing, from the violent Distension of the Arteries.——This Tumor terminates variously, according to particular Circumstances; as (1.) by *Dispersion*, when the obstructed Juices are attenuated and carried off into the circulating Mass without further Injury; (2.) by *Suppuration*, when the obstructed Blood breaks thro' and dissolves the Vessels into Matter or Pus, so as to form an Abscess; (3.) by a *Gangrene* or *Sphacelus*, when the Humours corrupt, and Life totally ceases in the Part; (4.) by a *Scirrhus*, when the more fluid Parts of the Humours are drained off or evaporated, the Remainder inspissated, hardened, and concreted together with the small Vessels into a solid Body; and from a Scirrhus in a glandular Part follows a Cancer, which is an intermixture of dead and living Vessels together.

Q. 15. How do you form a reasonable Conjecture in which of these ways a Phlegmon will terminate? A. From

A. From considering the Patient's Habit, way of Life, and particular Texture of the Part, with the Degree of Violence in the Symptoms themselves. Such Phlegmons as are slight, consequent from taking Cold, without any previous Indisposition, are most likely to disperse, if duly treated in proper time; those, following a Fever in gross Habits, generally suppurate; whereas Phlegmons in old and dropical People, have a strong Tendency to Gangrene and Mortification in a soft Part, and to a Scirrhus or Cancer in a glandular Part, which last as *Celsus* observes may take place in the Bones from a preceding Inflammation. Again, the more distant the Phlegmon is seated from the Heart, the more prone to a Gangrene; on the contrary, the nearer the Heart the more copious the Juices, and the more numerous the Vessels are in the inflamed Part, the more liable is it to Suppuration or Abscess.

Q. 16. By which of these five ways (Q. 14.) are you to assist Nature, to terminate a Phlegmon?

A. The two first of these are always the most eligible, more especially the former; that is, so to relax the Vessels and attenuate the

the obstructing Humours, as to restore the Circulation to its due Freedom and Moderation through the diseased Part, without offering any further Injury to the Vessels; and this more especially when the Inflammation is seated in a Part of the greatest Consequence, as the Brain, Lungs, or other Viscera, from whence the Matter formed in a Suppuration, could be difficultly if at all discharged; for in these Cases we have a License to use with the greatest Freedom the proper means for Dispersion, namely, Bleeding, cooling Purges, Refrigerants and Diluents, with Revulsives of all kinds. I say, we are to make use of these means more liberally to procure a Dispersion, as a Suppuration or Abscess would be more dangerous and difficult to remedy. Hence it follows as a general Rule, that a Dispersion must be attempted in all Inflammations, where that is practicable; but that if the Inflammation is obstinate and superficial, the Part of little Consequence, the Patient weak or with Child, &c. in that Case the Suppuration is to be promoted.

Q. 17. How do you attempt to disperse an Inflammation?

A. 1. By

A. 1. By discovering and removing all external Causes or foreign Bodies, which compress, irritate, or distract the Vessels. 2. By Bleeding plentifully, according to particular Circumstances. 3. By giving Purges and Clysters (*vid. R. N^o 1.*) which operate briskly without heating the Body, and repeating them at Discretion. 4. By Abstinence from all animal and gross or solid Food, except Veal or Chicken-broths, made extremely thin; by a plentiful Use of Acids and ascescent Liquors with Nitre, &c. observing also to confine the Patient to a temperate Air in his Chamber, encouraging Sleep and a calm Temper of Mind. 5. By the Use of antiseptic Cataplasms and Fomentations, (*vid. R. N^o 2.*) with very gentle Frictions, and in some Cases joined with Blisters, Cupping or Scarification, &c.

Q. 18. When and how do you promote Suppuration?

A. If the preceding Means have been used without Effect, if the Inflammation is obstinate or too far gone, and seated in a Part accessible to the Hand; in that Case the impervious Blood and stagnating Humours break through and dissolve the smallest Extremities

tremities of the obstructed Vessels, and fermenting together, both Solids and Fluids are formed into a cream-coloured, thick, mild, and inodorous Matter lodged in the Center and spreading to the Circumference of the inflamed Part, which is then called an Abscess; which I foresee by the proper Signs (§ 19.), and promote by the proper Remedies (§ 20.)

§ 19. By what Signs do you know Matter will be formed in an inflamed Part?

A. 1. From the Violence of the Inflammation, and Intensity of its Symptoms, (to wit, Fever, Pain and Pulsation) suddenly remitting, and followed with an Enlargement of the Tumor; which more especially inclines to Suppuration, when seated in the adipose Membrane. 2. From the Phlegmon succeeding after an Exanthematous or inflammatory Fever in a young or middle-aged Person of a plethoric Habit, and addicted to high living. 3. From a small Rigor, or Chilliness and Shivering, followed with an Easiness of the Part, pointing outward, and feeling soft to the Touch, &c. which last are the most certain and immediate Signs of Suppuration.

§ 20.

Q. 20. What Remedies are useful to forward the Suppuration?

A. These are either external or internal; the first include all unctuous and emollient Applications in the Form of Cataplasms (*vid. R. No 3.*) mixed with a little of the Gums, dissolved in the Yolk of an Egg, applied warm, and either renewed or kept constantly warm upon the Part. Internally, the Intensity of the Fever, or violent Motion of the Blood, is to be abated by bleeding and cooling Medicines till the Pulse becomes regular; but in weak Habits where the Pulse is low, strong Broths, Ale, and cardiac Medicines are proper, in order to prevent a Gangrene, which may as well be the Consequence of a too languid, as of a too impetuous Circulation in the affected Part. The Pulse ought therefore to be kept up a little higher than its natural Strength,

Q. 21. When is an Abscess to be opened for the Discharge of its Matter?

A. As Suppuration is a Dissolution of the dead and impervious Vessels, together with the Humours, into a mild Cream-like Matter; and as this Matter corrupts and becomes acrimonious if too long confined, so as to become attenuated and absorbed again into the
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 Mass

Mass of Blood; therefore in most Cases we ought not to wait for a spontaneous Rupture of the Skin or incumbent Fat, which ought to be incised, in order to discharge the Matter, and prevent it from spreading into the neighbouring Parts: but, on the other hand, in some Cases it is advisable to continue the Suppuration, till the Hardness, which is perceivable round the Tumor, abates; because if the Abscess is opened before this Hardness is resolved, it may continue crude and stubborn, disposing the Parts to be fistulous, when it might have been more easily dissolved by a longer Continuance of the confined Matter.

Q. 22. Is the Matter of an Abscess always to be brought to a State of Maturity before the Apertion?

A. This cannot be allow'd in some Cases; as when there is Danger of the Tumor's breaking into the Thorax, Abdomen, or some other important Cavity; as into that of a Joint, &c. where the spreading Matter might do great Mischief, unless it is immediately discharged.

Q. 23. In what manner do you open an Abscess? C A. Al-

A. Always by Incision, except some large Blood-vessel is near, or when the Patient will not submit to the Knife; or in case of a venereal Bubo or scrophulous Tumor, and then Caustics often take place of the Knife to advantage; observing to make the Opening always in the most favourable and depending Part, to facilitate the Discharge of the Matter, and always preferring the Knife to the Scissors, as the last pinch and contuse the Parts which they divide. The Thumb and Fore-finger are pressed on each side, while the Knife (*Tab. I. L.*) is enter'd into the palest and softest part of the Skin, and continued according to the Course of the Fibres, when necessary.

Q. 24. What Caustic do you prefer, and under what Circumstances is it to be used?

A. For destroying scrophulous and venereal Indurations of the Glands, which will neither discuss nor suppurate, and to expose a carious Bone, or open an Abscess, the best Caustic in use is the common Lapis infernalis of the Shops, mixed with Soap, and applied after the Part has been covered with a defensative Plaster, having a small hole in it, to limit the Action of the Caustic upon the Skin: and in this manner the Caustic may
continue

continue upon the Part about five or six hours, to destroy a large Gland; to expose or lay a Bone bare, about four hours; and for opening Abscesses, one, two, or three hours, according to the thickness of the Skin, and other Circumstances. When the Caustic has made an Eschar or Crust, the Scab should be mollified before it is taken off, by applying a little fresh Butter or Basilicon, or rather after the Skin is corroded, the rest of the Opening may be better performed with the Knife; thus the Matter being discharged, I then deterge, incarn and heal, as in clean Wounds.

Q. 25. How is an opened Abscess to be dressed and treated, in order for a Cure?

A. For the first time it may be dressed with dry Lint only, or with soft Digestives spread on Lint, if there is no Hæmorrhage. Over the Dossils of Lint may be laid a large Pledget of Tow spread with Basilicon, which lies much softer than a defensive Plaster, which frequently inflames and offers violence to the tender and naked Parts in its removal. The same Dressings are to be continued with a proper Regimen, till the Cavity is incarned by Nature, taking care to let the Dress-

sings, particularly the Bandage, fit as loose and easy upon the Part as possible; and in the next place it may be cicatrized when filled up, by the application of dry Lint or desiccative Powders, always keeping the Margin clean and free from fungous Flesh, by making a moderate Compressure with dry Lint, or by levelling the Surface with *Vitriol. Rom. vel Merc. præcip. Rub. &c.*

Q. 26. How often are the Dressings to be renewed?

A. The Repetition of the Dressings must be proportionable to the Quantity and Nature of the Discharge; for if the Matter is mild and small in quantity, once dressing in twenty-four hours will suffice; but sometimes two or three Dressings are required in that time, especially in hot Weather.

Q. 27. What is an *Erysipelas*, and wherein does it differ from a Phlegmon?

A. An *Erysipelas* is an Inflammation in the serous Vessels, as a Phlegmon is in the sanguiferous; being most frequently seated in the Skin, and other membranous Parts of the Body. An *Erysipelas* inclines to a deep Orange-colour, wanders from one place to another,

another, does not tend to Suppuration, but frequently terminates in Vesicles or Hydatides, containing a sharp serous Liquor, in the Skin of the Face, Neck, Shoulders, &c. and being pressed with the Finger, its Colour disappears, and then returns; which make the principal Marks whereby it is distinguished from a Phlegmon, which is rather confined to the adipose Membrane. Hence it is evident, that an Erysipelas may turn to a Phlegmon, or rather be intermixed with a Phlegmon, whenever the red Blood escapes into the serous Arteries, and propagates the Inflammation, not only through the Skin and smaller Vessels, but likewise into the adipose Membrane. This Inflammation generally invades with a shivering and slight Fever, after some Surfeit, violent Exercise, hard drinking, or taking cold, &c.

Q. 28. How do you treat an Erysipelas?

A. In the same manner as a Phlegmon (Q. 16.); only here Bleeding and Purging are to be used with more moderation, (as the Disorder lies more out of their reach) and a greater stress laid upon topical Applications, especially an Infusion of *Theriaca in sp. vin. campb.* & *aq. calc. viv. aa.* applied with linen rags;

as also an Infusion of the *flor. Sambuc. in acet. Litharg. &c.* frequently renewed; using Coolers and diluent Medicines internally at the same time, and cautiously avoiding fat and oily Substances, which being applied to the Skin, obstruct the Pores, and increase the Erysipelas partly into a Phlegmon; whence, like that, it often tends to a Supuration.

Q. 29. What kind of Tumor is an *Oedema*?

A. This Term originally signifies any soft pitting Tumor; but at present we make two kinds of it, namely, the *Oedema calidum* and the *frigidum*; though the latter is most commonly intended by the term *Oedema*, when used without farther distinction. — An *Oedema calidum* is then an Inflammation seated in the lymphatic Vessels, as an Erysipelas was seated in the serous ones; from whence it appears to differ only by being seated in smaller Vessels. As a Phlegmon is frequently intermixed with an Erysipelas, so an Erysipelas frequently joins itself with an inflammatory or hot *Oedema*; and in this shape it often appears in the Head and Face under the Title of *Gutta rosacea*. It is to be treated as an Erysipelas (Q. 28.)

Q. 30.

Q. 30. What do you understand by an *Oedema frigidum*, or an oedematous Tumor?

A. I understand by it in the common acceptance of the Term, a cold, indolent, and soft or pitting Tumor, from watery Humours distending the cellular Membrane, without any alteration in the Skin, except a shining Tenuity and Smoothness.

Q. 31. What are the principal and immediate Causes of these oedematous Tumors?

A. They proceed immediately either (1.) from a too poor or dissolved State of the Blood, when there is too great a proportion of Water and Serum in it, and too great a Laxity of the Vessels: the former from hard Drinking, Fevers, Hemorrhages, and Suppression of the Menses in Women; and the latter from a too great Weakness of the Vessels, and too low an Impulse of the Heart and Arteries, as in old People; or (2.) from a sedentary Life; to which add a Compression of any of the Veins, as of the Iliacs in Women with Child; a schirrous Tumor in the Abdomen, an Obstruction of the smallest lymphatic Veins by intense Cold, &c. Hence it appears that an Oedema is an Anasarca or kind of Dropsy in a particular Part; and

Q. 4s. S.) also, when

when accompanied with Heat or Redness in the Skin is an *Oedema calidum*.

Q. 32. How do you treat an *Oedema frigidum*?

A. For the Cure of this Tumor, a Regard must be had to the immediate Causes (Q. 31.) in the Body; in case of Weakness and old Age, or a dropical Disposition, proper Corroborants and Cardiacs, especially of the aromatic and nephritic kind, are to be given internally, while externally are used Frictions with warm Cloths often repeated, moderate Exercise gradually increased, the Application of strait Stockings or Bandages, after the Legs and Feet have been fomented with *aq. calc. & alcohol. vini aa ʒiv. alumen. rupei ʒj.* at the same time making a proper use of Chalybeats with the Bark, according to particular Exigences, beginning with small Doses, and gradually augmenting them; but not too hastily, which ought to be particularly observed in all cachectical or leucophlegmatic Habits, to avoid greater Mischiefs.

Q. 33. What do you understand by a *White Swelling*?

A. This

A. This is an oedematous Tumor in the Joints, without Heat or even Pain at first, arising up after being press'd by the Finger like a Sponge, and seldom appearing but in the Knees or Ancles. The Nature of it is the same with an Oedema (Q. 30.), excepting that in these Joints the cellular Membrane and lymphatic Vessels are interwove with many tendinous Fibres and Ligaments. It arises chiefly from a cachectical Disposition in relaxed Habits (mostly of Children), joined usually with some Violence or Strain offered to the Joint itself. The Bones here seldom continue sound long, but are usually affected, together with the surrounding Parts, as in a *Spina ventosa*, from the Acrimony of the confined Lymph and Matter in the cellular Membrane; and it is accompanied with a wasting of the Limb below,

Q. 34. How do you treat the *White Swelling*?

A. As it proceeds principally from a bad Habit in general, recourse must be had to proper alkaline, aromatic, and corroborating Medicines internally, the burnt Sponge with the *panacea Plumeri*, *aqua benedicta*, &c. while externally are applied the topical Medicines

dicines before recommended for an Oedema (Q. 32.); to which add dry Fumes of Sulphur, with Amber, Gum, Benjamin, &c. But when the Tumor is large and inveterate, we too often find it inflexible to all Means. Emollient and antiseptic Applications commonly increase the Disorder; or even if Incision is made through the Integuments to let out the distending Humours contained in the Joint, the Tumor commonly returns again as soon as the Wound is healed: but this is the only Means we have, in order to reduce the Tumor, by discharging the Humours from the Cavities of the Joint and cellular Membrane, to compleat which a strict Bandage is to be applied. Some indeed prefer opening the Tumor by Caustic, but both this and the Knife require great Caution in their Use and Application to these tendinous Parts; and even when the Opening is thus made in a bad Habit, it too often ends in a Caries, Fistula, or Gangrene of the Joint, which destroys the Patient.

Q. 35. What are the Effects of an irresolvable Inflammation which does not tend to suppurate?

A. In

A. In this Case the Humours are inspissated, turned into a Solid, and concreted together with the Sides of their containing Vessels, which then become as so many dead and foreign Bodies, more or less injuring the Nerves, and other adjacent living or pervious Vessels. Therefore the Effect of such an Inflammation (if in a moderate degree) will be, in the Substance of the Bones, an Exostosis or Node; in the Glands, Scirrh, incysted Tumors, Cancers, Buboës, Strumæ, &c. in membranous Parts, and in the Skin, Callosities, Warts, Corns, &c. Ganglions in the Tendons.—But if it afterwards tends to ulcerate, from thence follows in the Skin leprous Disorders, Boils, scald Head, &c. in the Bones a Spina ventosa, in a glandular Part a Cancer, &c.

Q. 36. How does an irresolvable Inflammation terminate, when it is more violent, in a fleshy Part, and does not tend to suppuration?

A. The Event will then probably be a Gangrene or Sphaceus, a Caries of the Bones, or a malignant Ulcer, &c.

Q. 37. What is a Scirrhus?

A. This

A. This is a hard, unequal Tumor, with little or no Pain, seated in some glandular or membranous Part, formed by an Inspissation of the Humours, obstructing the excretory Ducts of the Gland, and distending the membranous Follicles or Cells thereof, while the more fluid Parts of the Humours are drained off or exhaled. Thus an Inflammation only in such a Part, over-distending the Arteries, will compress the excretory Ducts, while the Humour is poured in too fast to pass through them; whence a Retention, Accumulation, Inspissation, &c. until the Cells of the Gland are distended almost to any given degree, so as to compress most of the interspersed Nerves and Blood-vessels in the Substance of the Scirrhus.

Q. 38. What Parts are most liable to this Disorder?

A. Chiefly those membranous and glandular Parts which supply a viscid Humour, much inclined to inspissate and harden; as in the Eyes, Nose, Mouth, Breasts, Armpits, Groins, Testicles, Stomach, Bladder, Pancreas, Mesentery, Uterus, &c. The Dangeroufness and Symptoms of which vary according to the Nature and Importance of the Part,

Part, which is itself Scirrhus; and of those Parts liable to be compressed or injured by its Vicinity, and as it may in time degenerate into the most dreadful of Disorders, a Cancer.

Q. 39. How do you treat a recent Scirrhus in a good Habit of Body?

A. I first attempt to disperse it by Mercurials prudently used, and chiefly by Uction, with very moderate Frictions, and the dry Fumigations mentioned for a White Swelling (Q. 34.), supplying the Patient liberally with the Drink of Aqua calcis, a plentiful Use of Camphire internally, with lenient Purges repeated at discretion; cautiously avoiding all violent Means at first, which would rather confirm than dissipate the Disorder.—If these Means fail, and the Disorder is local, and not likely to return in other Glands, at the Patient's Desire I extirpate it by the Knife, when that can be safely done; or if there is a Tendency to Suppuration after a Fever or Inflammation, even in scrophulous Indurations, I sometimes apply the Caustic with success.—But if the Scirrhus is inveterate, and appears from its Colour, Pain and Itching to be malignant; and if the Patient's bad Habit and its Situation forbid an
Extir-

Extirpation of it, in that case all caustic, suppurating and healing Medicines, both externally and internally, must be cautiously avoided to prevent a Cancer, and recourse must be had to Anodynes and Coolers, as well externally as internally; such as Acetum lithargyritum, an Amalgam of Mercury with Lead; being careful at the same time to regulate the Action of the Mercury, that it may not too much increase the Momentum of the Blood, and endeavouring also to correct the Patient's bad Habit.

Q. 40. Do you approve of Caustics to destroy a Scirrhus?

A. These irritate, and often threaten a Cancer very much; and therefore the safest and speediest way to remove a large or painful Scirrhus, is to cut out the indurated Part entirely by the Scalpel, provided one can do it without leaving any Remains, or risking a fatal Hæmorrhage. What has been said of Scirrhi is also true of Strumæ, or scrophulous Indurations of the salival and lymphatic Glands; which yet I have known well destroyed by Caustics in young Patients.

Q. 41.

Q. 41. What is the Nature of a *Cancer*?

A. From what was said of a *Scirrhus* (Q. 37.) it is evident that a great part of it is a dead or foreign Body impervious to the Circulation, though at the same time there are many pervious living Vessels and Nerves interspersed on the Surface, and through the Substance of the *Scirrhus*; so that when these living Vessels and Nerves upon the Surface are inflamed and irritated, so as to become painful from any Cause, the *Scirrhus* is then termed a latent or *occult Cancer*; and if this Inflammation continues so as to destroy the Vessels, and break through the Integuments, by a sharp corroding Ichor, it is then termed an open, or *ulcerated Cancer*. Hence it is evident, that every thing which irritates a *Scirrhus* externally, or which increases the Circulation too much, whether Plethora, Obstruction or Acrimony from more remote Causes, may turn a *Scirrhus* into a *Cancer*.

Q. 42. How do you know an *occult* and an *ulcerated Cancer*?

A. A *latent Cancer* is discovered from a *Scirrhus* preceding, and being followed with a Titillation, Itching, and a slight or more intense Inflammation and Pain; the Tumor

in the mean time enlarging, while the adjacent Blood-vessels appear more conspicuous of a livid Colour, and distended with Knots or Varices. — But if after these Appearances the Skin breaks, and discharges a corroding Ichor, I then know it to be an ulcerated Cancer; which is more or less malignant, as the Ichor is more corroding, foul and cadaverous; as the Roots spread, and the Lips turn back more on all sides; as the Pain is more burning and intolerable, and the Colour more livid or black. This at length induces occult Cancers in other Parts, fatal Hæmorrhages, Convulsions, Fever, Wasting, Loss of Smell, &c. ending at last in Death, of which the Patient is made very desirous by the direful Symptoms.

Q. 43. How do you treat an *occult Cancer*?

A. Unless it can be extirpated by the Knife, or cast off by a laudable Suppuration, as very rarely happens, a Cancer admits of no Cure but what is palliative. But above all, Care must be taken not to render a latent Cancer ulcerated, by the Application of emplastic, suppurative, acrid or caustic Substances. Unless therefore there is a probability

lity that the Cancer may be removed without a Return of the Disorder in other Parts, it ought not to be treated either by the Knife or topical Medicines ; but I rather endeavour to keep the Disorder quiet, and to mitigate the Symptoms : namely, by saturnine and narcotic Medicines externally, a frequent use of lenient Purgatives, with Mercurials, diluent and aperient Medicines internally, avoiding every thing that disturbs the Sedateness and Equability of the Circulation ; and by the same Means the Symptoms will be also mitigated, calling in the Assistance of Opiates when necessary. The same Methods are to be used also to palliate an ulcerated Cancer, when it cannot be extirpated.

Q. 44. What kind of Tumor is a *Bubo*?

A. This is a painful and inflammatory Swelling in the inguinal and subaxillary Glands, tending either to a Suppuration or a Scirrhus. These are distinguished into *critical*, those which happen after a Fever ; *pestilential*, which happen in the Plague ; and *venereal*, arising with or without a Gonorrhœa in the venereal Disease.

Q. 45. How do you treat a *Bubo*?

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A. As

A. As for critical and pestilential Buboes, the best Method is to promote and bring them to Suppuration as soon as possible by Cordials internally, with suppurating Cataplasms (*vid. R. N^o 3.*), and a Galbanum Plaster externally: but for venereal Buboes, if they are not too far gone, I attempt to disperse them by mercurial Uction, with Bleeding, Purging, and a Decoction of the Woods drank plentifully, keeping the Patient in a cool Regimen: but if the Dispersion does not succeed, I endeavour to promote a Suppuration by high living, dry Frictions upon the Part, a maturing Cataplasim often applied warm, and a Galbanum Plaster as before, till the Suppuration is well advanced; and then I make an Opening either by the Scalpel or Caustic, especially the latter when there is any remaining Hardness, and complete the Cure by detarging with some digestive Ointment, mixed with a little Merc. præcip. then incarn and heal as in other Abscesses.

Q. 46. How do you distinguish *incysted* Tumors?

A. These are Tumors formed by an Obstruction of the lymphatic and other Arteries in

in the Glands, and in the adipose Membrane; being usually covered with a pretty thick Coat or Membrane, with which most Glands are invested, and which is often distended to an immense Bulk by the included Humours inspissated and reduced to a certain Consistence; from whence the Tumor is denominated either a Scirrhus, when it is very hard; an Atheroma, when the included Matter is like Paste; a Steatoma, when it resembles Suet or Lard; a Meliceris, when it resembles Honey; and a Sarcoma, when it appears fleshy: though these Tumors, as *Celsus* (*Lib. 7. cap. 6.*) observes, are often found full of Hair. These differ from a Scirrhus, in that the vascular Fabric of the Gland (when that forms the incysted Tumor) is dissolved by the Humours into a thick inorganised Matter or Paste, confined within the Follicle, (a muscular and vascular Membrane investing all compound Glands, to enable them to urge forward their contained Fluids) which becoming thicker and harder forms the Cyst of the Tumor: whereas in a Scirrhus, properly so called, the organic, nervous, and vascular Fabric remains undissolved, and is therefore capable of Irritation and Pain, so as to form a Cancer; but in

the incysted Tumor there is no Sense at all, except in its Follicle or including Cyst. The interior Surface of the Cyst being spread with the Mouths of the dissolved Vessels, many of which remain pervious, continually ouze a lymphatic Humour into the Cyst, (when there is a Redundancy of Fluids and a strong *Vis Vitæ*) which thus gradually dilates and thickens, while the Humours are inspissated and digested into a Mass like the rest: but they do not tend to suppurate or form laudable Matter; for that requires a greater degree of Inflammation, and that the Humours be not lymphatic but sanguineous; and here the aqueous Parts are drunk up by the venal Mouths, as fast as they are pour'd in by the arterial, the grosser Parts of the Lymph remaining, and thus the Tumor will enlarge almost to any given Size.

Q. 47. How do you treat these Tumors?

A. If they can be neither dispersed nor brought to Suppuration, they must be directly extirpated by the Knife; or if the Tumor be small and superficial, the Caustic will often succeed very well: but when the Tumor is large, a longitudinal Incision must be made through the including Cyst, and the
Matter

Matter extracted together with the Cyft; which if it should leave any part behind, must be brought away by digestive Ointments, with *præcip. rub. &c.* untill the Sinus is reduced to the State of a clean Wound, when it may be incarned and healed.

Q. 48. What is the Nature and Treatment a Ganglion?

A. It is an indolent hard Tumor in a Tendon or Ligament, most commonly either in the Hands or Feet, arising from an Inflammation caused by some Contusion or Strain, and is often very difficult to reduce. There are two kinds of this Tumor, one formed of the Synovia, inspissated and hardened within the Capsule of the Tendon, often adhering to both; the other is from a Distension of the parallel tendinous Fibres, betwixt which the Blood and serous Vessels are distributed: if now by any Blow, Stimulus, &c. the Artery imports Humours faster than they can be transmitted through and from the Tendon by the Veins, as the Fibres of the Tendon resist, there will be consequently an Obstruction in the serous Arteries, which are almost the only ones in a Tendon; but it is the nature of Serum or Lymph not to suppurate,

but to harden; and as the Fibres are more removed from each other by the distended Arteries, which act with a greater Force upon the Fluid than the Veins; from thence again the Veins will be obstructed, and the Tumor more increased and hardened, as the Veins will return only the more aqueous Parts, while the grosser are retained. Hence it appears that repeated Frictions, Pressure, and rubbing with actual Warmth, are the most likely Means to assist the obstructed Arteries, to send forward their stagnating Contents, and to promote the Return of the Humours by the Veins; or if these do not succeed, those of the first kind may be removed by Extirpation with the Scalpel, if the Tendon or Ligament itself be carefully avoided.

Q. 49. What is the Nature and Treatment of *Paronychiæ*, or *Whitloes*?

A. A *Paronychia* is an exceeding painful Inflammation in the Extremity of the Finger tending to Suppuration, and is distinguished into three kinds; the first and slightest whereof is in the common Integuments and adipose Membrane round the Nail; the second kind is an Inflammation of the Periosteum, which invests and nourishes the Bone and

and soft Root of the Nail itself, being much more painful than the former, and not so readily coming to Suppuration; often attended with a violent Fever and other bad Symptoms, though the Pain and Tumor are confined to the Finger. The third and worst Species of the *Paronychia* is seated in the Tendons, or their nervous Involucra, inserted into the Bones of the last Joints of the Fingers; for it is remarkable, that the Tendons which bend the two last Internodes of the Fingers, are covered by strong ligamentary Sheaths almost as hard as a Cartilage; so that if an Inflammation be formed either in the ligamentary Sheath itself, in the cellular Membrane, Periosteum, or flexor Tendons, the inflamed Vessels having no room to dilate from this particular Fabric, the Pain and Inflammation will from that Stricture be infinitely increased, and the Pain so excruciating as often to cause the most intense Fever, Restlessness, Convulsions, Delirium, &c. and tho' a little Tumor appears in the Finger, yet the whole Hand and Arm become very much swelled, and full of Pain. From both these last Species of the *Paronychia*, if neglected, and the Patient escapes with Life, there may follow a loss of the Bones corrupted with

a Caries. The Cure is to be conducted according to the several Species of the Disorder; but generally in all the Species it is advisable not to wait for a Suppuration, but to lay open the inflamed Parts by Incision, to remove their Stricture, and discharge the confined Matter, if there is any, before it has affected the Bone or adjacent Parts. In the two first Species the Incision may be made longitudinally on each side the Nail, and through the Nail itself to the Bone, when the Periosteum is inflamed; but in the last and worst Species, the Incision must be made through the Integuments on each side of the Finger with a Lancet, so as to divide the ligamentary Capsules or Sheaths, confining the Tendons close to the Bones, without injuring the Tendons themselves, as may be easily done by one versed in the Structure of these Parts. The sooner this Incision is made the better, and afterwards may be applied a Fomentation of *aq. calc.* & *S. V. Camph.* the Patient may be bled in the other Arm, a cooling Purge may be given, &c. as in other Inflammations (Q. 17.); afterwards the Wound may be dressed with Tincture of Amber, Bals. Peruv. &c. and if the Bone is foul, the Wound must be kept open, either till the diseased
Part

Part exfoliates, or till the whole Bone comes away. The Dressings are compleated with dry Lint, retained by a Dyachylum Plaster and Compress cut in the form of a *Malta* Cross, secured by a Fillet of about a foot long and a finger's breadth, applied spirally round the Finger. If the Pain and Tumor do not go off after making Incision through the ligamentary Capsule of the Tendon, it is a Sign that the Inflammation extends farther, and that the Capsule of the second Internode must be likewise divided; and even sometimes it is necessary to continue the Incision into the Hand itself, or even to the annular Ligament of the Carpus.

Q. 50. What is the Nature and Method of curing *Wens*?

A. These are soft fleshy Tumors, or rather Productions of the true Skin and cellular Membrane, the Blood-vessels of which are often wonderfully enlarged, so as to produce these Tumors of various Forms in different Parts of the Body. They may be removed by Ligature sometimes, provided the Stricture is not too great, for that I have sometimes known to bring on a Fever and Convulsions; and when the Basis or Neck
of

of the Tumor is sufficiently contracted towards the Skin by Ligature, it may be taken off by the Scalpel, taking care to tie up the larger Blood-vessels. But this is an Operation not advisable, when the Patient is of a bad Habit, or when there are Glands near the Tumor, as it then often turns out cancerous and incurable.

Q. 51. What is the Nature and Method of curing *Warts*?

A. These are Excrescences of the Vessels of the true Skin, joined together with the Cuticle; the former, not being restrained by the latter, are extended for want of a due Resistance, so as to form an Excrescence, which may be taken off either by the Scalpel or Caustic, or by Ligature with a Thread or Horse-hair; or after clipping off the top of the Wart with a pair of Scissors, the Root may be destroyed by a drop of Oil of Vitriol, or Butter of Antimony. But Care must be taken to limit the Action of the Caustic from spreading to the sound Skin by a defensative Plaster with a hole cut in it.

Q. 52. What is the Nature and Treatment of *Corns*?

A. These

A. These are a sort of inverted Warts or Callosities of the Cuticle and Skin, made by repeated Inflammation, Pressure or Attrition, which closes up the Vessels, and turns a vascular Part into a solid; and when these extend to the Tendons of the Hands and Feet, they prove extremely painful. Those of the Feet commonly arise from wearing too small Shoes, and those in the Hands seldom occur but in very laborious People. The only Remedy is by keeping that part of the Skin free from Pressure, after the Callosity has been often macerated, pared away, and softened by a constant wearing of some emollient Plaster.

Q. 53. What is an *Exostosis*?

A. This is properly a Luxuriency of the Callus in a fractured Bone, or a hard bony Excrecence answering to a Sarcoma in the soft Parts: and this sometimes happens as well without as with a Fracture, when the nutritious Vessels of the Bone being dilated, cause an Enlargement either of its whole Substance, or of some part, by distending the Lamellæ, betwixt which those Vessels are distributed. And although these Exostoses or Nodes most frequently arise in the venereal

real Disease; yet they also sometimes proceed from external Injuries, as a Contusion upon the Shin or Spine of the Tibia. These Tumors are hardly to be removed but by cutting off the Excreſcence equal with the Surface of the Bone, then waiting or procuring an Exfoliation and Renewal of the Periosteum, as in other exposed Bones.

Q. 54. What is the Nature of a *Spina ventosa*?

A. This is a Caries and Enlargement of the Bone from an internal Cause, namely, an Inflammation in the internal Periosteum and Medulla, ending in a Suppuration. Thus the Humours and medullary Oil becoming putrid, do by their Acrimony dissolve the nutritious Vessels and gelatinous Substance of the bony Fibres, leaving their earthy or chalky Part friable like a Calx. This then is an Abscess of the Bone, proving the most mischievous when seated in the spongy Heads and Processes; and frequently arises from a Contusion of the Medulla by some Blow or Violence, especially in the Tibia, which lies much unguarded. This is discovered from an Inflammation having preceded in the Bone; from an Enlargement of the Bone itself, with
a throb-

a throbbing Pain, and often a Discolouration of the superincumbent Parts. The white Swelling, in the worst degree, is a *Spina ventosa*; only arising from an Erosion of the Heads of the Bones in the Joint externally by the acrid Lymph, Synovia, or confined Matter in the Cavity of the Joint and cellular Membrane.

Q. 55. How do you treat a *Spina ventosa*?

A. The only Means of relieving the *Spina ventosa*, is to make an Opening the nearest and safest way through the soft Parts into the Bone itself, which may be perforated either by the Trepan or Chissel, as shall appear most convenient, in order to discharge the corroding Sanies, which may be washed out by suitable Injections into the Cavity of the Bone, while the Patient is kept upon an acescent and milk Diet, and treated with internal Medicines which resist Putrefaction; and unless this can be done, nothing remains capable of saving the Patient except an Amputation; nor even will that suffice, if the Disorder, proceeding from a venereal, scorbutic or rickety Disposition, breaks out again in other Bones.

Q. 56.

Q. 56. What are *Tophes*, *Nodes*, and *Gum-mata* of the Bones?

A. These are Tumors or Excrescences, of the Substance of the Bone itself, differing only in degree of Hardness: thus a Node is little inferior in Hardness to the Bone itself; a Tophe is still softer like Horn; and a Gumma is even susceptible of the Impression of the Finger, like the soft Gums. In these Cases there seems to be a Deficiency of the cretaceous Earth, with which the Bones ought to be supplied, to give them a due Firmness; and of this we have frequent Instances in venereal, scorbutic and rickety Patients, in which the Bones have degenerated into a soft and even fleshy Nature, which is then termed *Osteosarcosis*.

Q. 57. What is the Nature and Treatment of a *Furuncle* or Boil?

A. This is a very painful and inflammatory Tumor of the Skin and cellular Membrane, tending to Suppuration, and proceeding mostly from an uncommon Acrimony of the Humours. If they will not disperse by the use of *sp. nitri dulcis salis D. &c.* which are particularly useful here, they must be brought to Suppuration by a Galbanum Plaster, or
Diachylon

Diachylon *cum Gummis*, emollient Cataplasms, &c. but those in Children are often very stubborn and troublesome, unless the acid Acrimony of their Humours is obtunded by Absorbents, mild Bitters, and soapy Mixtures.

Q. 58. What is the Nature and Treatment of the *Scald Head*?

A. This is an ulcerated Crust or Scab spreading over the Scalp, with an ill Smell, violent Itching, and sometimes Inequalities like a Honey-comb, breaking out mostly in Children from feeding upon too gross Aliments, and especially from a predominating Acid in the Blood; but there is often a venereal Scabies resembling this in the Head and Face of Adults. The chief Remedy in this Case is the *Æthiops aq. benedict. elect. cinnab.* &c. while externally is applied a Pitch Plaster, which takes off the Hair by the roots, and which must necessarily be removed in order to a Cure; and when by the use of the Pitch Plaster, the ulcerated Scab appears clean and free from Hair, it may be anointed with *ol. cera*, and at last healed with *Fryer's Balsam* and dry Lint,

Q. 59. What is the Nature of a *Gangrene*?

A. This is an incipient Mortification in a fleshy Part, proceeding from the Circulation suppressed either by external or internal Causes; such as extreme Cold, Weakness of the Circulation, a Want of nervous Fluid, the Division of a Nerve or Artery, a violent Inflammation, which can neither be dispersed, nor brought to Suppuration, &c. and therefore a strict Regard must be had to which of these Causes are productive of the Gangrene, which usually begins in the Panniculus adiposus, or Integuments; and spreading by degrees forms a perfect Sphacelus, when it is extended to the Bone.

Q. 60. What are the Signs of a present *Gangrene*?

A. These are taken (1.) from considering the preceding Causes (Q. 59.); (2.) from the Inflammation and Pain suddenly disappearing, and being followed with a dull Sensibility in the Part, while the Integuments turn pale, blue, livid, or inclined to black; (3.) from a Softness or Flaccidity and Pitting of the Skin, which has Vesications filled with a yellowish or reddish serous Ichor.

Q. 61.

Q. 61. How do you treat a *Gangrene*?

A. In order to prevent it from turning to a Sphacelus or compleat Mortification, a regard must be had to the immediate Cause in the Patient's Habit (Q. 59.); the Circulation is to be kept up by Cordials and proper Diet; the putrid Humours are to be prevented from returning into the Blood, by discharging them externally, by Scarification, Cupping, Leaches, and warm antiseptic Fomentations or Cataplasms; by procuring a Separation of the dead from the living Parts by the Application of a continual Warmth, either by Tiles or Sand heated and wrapped up in Cloths; while in the mean time aromatic and spirituous Substances are not neglected, after the dead Parts have been scarified down to the living, fomenting next with Salt, Vinegar, Wine or Brandy, and Spices, which have a Power to restrain the Vessels and Humours from Corruption. In the mean time a free Circulation must be restored as much as possible by diluting internally, with the use of Cordials, external Warmth, and moderate Friction; and if by these means the Parts cannot be restored to their due Circulation, we must endeavour to separate the dead from the living, by promoting a Suppuration in

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the

the manner before-mentioned, namely, by scarifying the dead down to the living Parts, with Cupping, Leaches, &c. as before, and a prudent use of the Bark internally; while externally Cataplasms are kept constantly warm upon the Part, until the Signs of a Suppuration follow, by which the living Parts recede from the dead. — But if the Gangrene proceeds from Cold, it will be proper to apply Snow, &c. as we have observed in the Treatment of Chilblains (277.)

Q. 62. What is a *Sphacelus*?

A. This a complet Mortification extended even to the Bone, (so that a Knife may be run through the Part without causing Pain) spreading by degrees further into the living Parts, and yielding an intolerable cadaverous Smell.

Q. 63. How do you treat a *Sphacelus*?

A. As there is here an Impossibility of restoring the diseased Parts to their Vitality, we must procure a Separation of the dead from the living Parts either by Nature or Art: that is, by exciting a Suppuration betwixt the dead and the living Parts with warm Cataplasms applied externally, and by the Bark given

given internally ; of which ʒj or ʒjss in Powder may be taken every four hours, or rather ʒjss of the Extract, which has produced surprising Effects in preserving the living Vessels sound, and preventing the spreading Sphacelus, as well as in suppressing the Fever and its most urgent Symptoms. But if it is necessary to restrain the Bounds of the Mortification immediately from extending farther, that may be done by circumscribing with a Pencil-Brush dipped in a Solution of *argent. viv. p. 1.* in *aqua fortis, p. 2.* or in *butter of antimony*; each of which may be diluted with *sp. vini*, if judged necessary, being cautious at the same time to avoid touching the Nerves, Tendons, &c. These Methods are also necessary to be used, if the Mortification spreads after an Amputation has been made of the dead Part.

Q. 64. What is an *Ulcer*, and how is it caused?

A. An Ulcer is an old cavernous Wound or Solution of Continuity in a soft Part, arising mostly from some internal Cause, usually an Abscess; and being subject to a considerable Discharge of Humours is often very difficult to cure, more or less according to the

nature of the Part, as the Case is more or less inveterate, and as the Patient is of a good or bad Habit. If the Ulcer be inveterate, sinuous and callous, it is called a Fistula; or even if it be recent and without Callosity, but seated in the Anus, it is usually so denominated. As a Suppuration or Abscess is preceded by an Inflammation, so an Ulcer is generally produced by the breaking of an Abscess; and when this happens within the Bones, it is termed a *Spina ventosa*: so that any thing which produces a Corruption of the Humours and Vessels may cause an Ulcer; such as Inflammations, Wounds, Contusions, Fractures, Luxations, Scirrhus, Cancer, &c.

Q. 65. How do you treat an *Ulcer*?

A. A simple Ulcer, that is, one neither venereal, scorbutic, cancerous or callous, requires only to be deterged, or brought to the State of a clean Wound, and then to be incarnated and cicatrized as such. In order to the first, the Ulcer must be laid open as much as possible, that its whole Surface may be deterged or cleansed by the immediate Application of Digestives, such as *tinct. myrrhæ & aloes, basilic. flav. cum merc. præcip. &c.* and then during the Incarnation, the
Dressing

Dressing may be made only with dry Lint, if it affords a laudable Matter, otherwise the Lint may be spread with some vulnerary Balsam, carefully avoiding the use of Tents and liquid Injections, as they induce a Callosity, and macerate and destroy the sprouting Granulations of the good Flesh; but if the Ulcer be deep, its Mouth must be kept open by filling it full of Lint, to give an opportunity of dressing down to the bottom, and to prevent the Lips from closing too soon. When the Cavity is incarned, I cicatrize with dry Lint, or with *Fryer's Balsam* and a moderate Compressure, taking down any Inequalities or proud Flesh by touching them with *vitriolum cæruleum, præcip. rub. alum. ust. pulv. myrrhæ, &c.* to bring it to a level, as the Cuticle advances round the Margin.

Q. 66. How do you treat a *fistulous Ulcer*?

A. As in this Case there is always a considerable Cavity, and usually a Callosity, it will be impossible to make a Cure until the callous Parts are removed either by the Knife, or the use of Escharotics; in order to which, the fistulous Ulcer must be laid open as much as possible by Incision, or by dilating its Orifice with a Sponge-Tent, if the Patient will

not admit of the Knife. If the Fistula penetrates in such a manner, that Dressings cannot be conveyed to its Fundus, it may be proper to inject a mixture *ex terebinth. vitel. ov. ung. Egypt. tinct. myrræ* aa well incorporated; and when the Fundus has been deterged by this Injection repeated, the Parts are to be brought together and united by Compressure and Bandage gradually made from the bottom upwards; but it is always more advisable, if possible, to lay open the Fistula to the bottom by the Knife, by which a certain Cure may be made without danger of the Disorder breaking out again,

Q. 67. How do you treat *cancerous* and *venereal Ulcers*?

A. These generally require the use of Mercurials both as well internally as externally; for here Digestives are mischievous, and their place must be supplied by the *aq. phagedenica*, a Solution of Sublimate in *S. V.* Fumigation with Cinnabar; raising a gentle spitting occasionally at the same time by Internals, and keeping it under by lenient Cathartics; all which is more especially necessary in venereal Ulcers. In the mean time the Patient must avoid every thing which heats

heats the Blood, drinking plentifully of a Decoction of the Woods; and the Ulcer itself must be fumigated, or dressed with the mercurial Liquors before directed.

Q. 68. How do you treat an Ulcer with a Caries of the Bone?

A. If the Bone appears foul, which I discover by its Sponginess and Inequality to the Finger or Probe, and its dark or blackish Colour, the Periosteum being here destroyed, I immediately enlarge the Opening as far as is convenient, and then endeavour to procure an Exfoliation, either by applying a Pencil-Brush dipped in a Solution of Mercury in aq. fort.; or rather I perforate the diseased Lamella of the Bone with a Terebra like a triangular Needle, with many small Apertures, and then dress with dry Lint, or some Balsam; by these means the repullulating Vessels of the sound Lamella will grow up through the Foramina, throw off the dead Scale, and renew the Periosteum, hastening the Cure much more than the Raspatory or the Cautery; if the Caries penetrates into the Medulla, the Bone must be perforated with the Trepan, as in a Spina ventosa of the Tibia (Q. 55.) Hence it is evident, that the Cure of a

Caries consists chiefly in removing the foul part of the Bone, that the Periosteum may be renewed over the sound Lamella. If the Caries is in the spongy Heads of the Bones in a Joint, the only Remedy is to amputate; or if it happens in a small Bone, as of the Carpus, Tarsus, &c. it must be entirely taken out, unless the diseased part of the Bone separates from the sound, as sometimes happens even in the larger Bones.

Q. 69. What is an *Emphysema*?

A. This is a Tumor from elastic Air collected in the cellular Membrane, which is sometimes inflated, after the manner used by Butchers to make their Meat appear fat: thus when the Integuments of the Skull have been wounded, the Air contained betwixt the Plaster has insinuated itself into this Membrane, and spread itself all over the Face and Eyes, so as greatly to disfigure the Patient, and prevent the Eye-lids from opening: but above all, these Tumors happen most frequently in Wounds penetrating the Thorax, when the Air confined in that Cavity is forced into the cellular Membrane next the Pleura and intercostal Muscles. In this Case the contained Air is to be brought to the
Opening

Opening by Pressure with the Hands, and by the Application of suitable Compresses and Bandages; or an Incision must be made through the Integuments in the most commodious Part, to make a way for the Air to be pressed out. Thus imposing Beggars sometimes make a small Puncture through the Skin of the Forehead in some Infant with a Penknife, and by inserting a small Quill, they inflate the subcutaneous cellular Membrane so as to make the Child a very moving Object, and incapable of being known by its nearest Friends.

Q. 70. What Observations have you made with respect to *Mortifications*?

A. That a particular Regard must be had to the Causes, in order to point out the Method of Cure: as if it proceeds from Inflammation, often accompanied with black or thick Urine, the antiphlogistic Method of Cure must be followed by Bleeding and cooling Medicines, &c. But if a Gangrene arises from Weakness, or a languid Circulation, the Bark and other cordial Medicines are found of the greatest Benefit.

Q. 71.

Q. 71. What have you observed with respect to *Ulcers*?

A. That in Women they receive an Alteration in their Appearance and the Discharge of their Matter every Month, when the Menfes are suppressed; and that in such, as also in dropsical Habits, they are extremely difficult to cure, even though assisted by proper Evacuations and alterative Medicines.— That Ulcers which have been subject to a profuse Discharge for any time, ought never to be healed up without substituting Issues and other Evacuations, repeated at convenient Intervals, to draw off the redundant Humours, and prevent them from settling upon the Lungs, &c. — That in putrid Ulcers, as well as in Mortifications, where there is a Return of foul Matter into the Blood, Acids are of the greatest service to correct the State of the Humours.— That when a considerable Pulsation and Redness appears in an old Wound or Ulcer, it often presages a consequent Hæmorrhage, especially in Women a little before the approach of their Menfes.

Q. 72. What is the Nature of a *Burn* or *Scald*?

A. It

A. It is an Inflammation differing in degrees, according to the Intensity of the Fire or Heat applied, by which the Vessels are contracted, shrunk up and destroyed, the Humours coagulated, obstructed, or extravasated: so that the Effects of burning in different degrees resemble those of a Phlegmon, from the slightest Inflammation, till it degenerates into the worst Sphacelus. Burns or Scalds therefore vary according to the Intensity or Duration of the burning Cause, and the particular Nature of the affected Part. Thus boiling Spirit of Wine scalds much less than Water, Water much less than Oil, Oil than melted Lead or other Metals, &c. and each of these burn more or less in proportion, as they are suffered to continue a longer or shorter time upon the Part. But which ever be the Cause, the Action is the same, namely, a Destruction of the Vessels and circulating Humours tending to a Gangrene; yet so that there may be as many degrees between the smallest and greatest Burns, as betwixt the slightest Erysipelas and the most perfect Sphacelus.

Q. 73. How many Degrees of burning do you make, and how do you distinguish them?

A. They

A. They may be properly distinguished into four Classes; the first and lightest of which is, when the Vessels are so far injured, as to cause an Inflammation and Redness without a blistering of the Part. The second is when the Cuticle is raised into a Blister, attended with great Pain; and these two agree with a resolvable Inflammation. The third Degree is when the Integuments or Flesh are so burnt as to form a Crust or Eschar, which must, as in a Gangrene, be cast off by Suppuration. The fourth and last Degree is when the fleshy Parts are burnt and destroyed to the Bone, so as entirely to deprive them of the vital Circulation; and this agrees with a complet Sphacelus.

Q. 74. How do you treat *Burns* and *Scalds*?

A. As these agree in their Nature with the different degrees of Inflammation, so they come under the antiphlogistic Method of Cure; Bleeding, cooling Purges, plentiful drinking of thin Liquors, with the application of topical and discutient Remedies, are therefore required when the Burn or Scald comes within the Limits of a resolvable Inflammation. Hence the immediate Application

tion of every thing which preserves the Vessels firm and able to sustain the Impulse of the Humours, will be serviceable in Burns, as they prevent Extravasation; thus Ink, Vinegar, Alum dissolved in Water, Alcohol Vini, &c. immediately applied in a slight Burn or Scald, will prevent a blistering of the Part; and such things as attenuate and dissolve the Humour, so as to make them capable of pervading the small Vessels, will disperse the Inflammation, Pain and Tumor; such are raw Onions, Soap and Oil beat to a Cataplasm, holding the Part before the Fire, Tincture of Steel in Spirit of Wine, Saccharum Saturni, and other saturnine Preparations, are of the greatest use in these Cases.

Q. 75. How do you treat a Burn of the second Degree, with a Vesication of the Skin?

A. In this Case it is most advisable not to open the Blister, unless it be extremely large, because the Lymph will be absorbed, and the Cuticle makes the best and most natural Defence to the Skin, whence it ought to be preserved. In this Case therefore the Patient is bled, and treated as in other Inflammations, while cooling internal Medicines are used with

with emollient and saturnine Topicals, or those before directed for Burns of the first Degree (Q. 74.)

Q. 76. How do you treat a Burn, which is so great as to tend to a Gangrene?

A. As in this Case one cannot hope to restore the Parts to their natural State by dispersing the Disorder, my Intention therefore is here, as in other Inflammations of the same Degree, to promote a Suppuration, in order to separate the Parts, which have been so altered by the Fire, that they are dead, and deprived of the Circulation. The Eschar is therefore to be treated with Emollients and warm Cataplasms, till it is cast off; and when the Burn is brought to the State of a clean Wound by the use of Digestives, I then incarn, and cicatize as in other Wounds. But for burning in the fourth Degree (Q. 73.), nothing but an Amputation can succeed, since it is to be considered as a perfect Sphacelus.

Q. 77. What is the Nature and Treatment of Inflammations and Tumors arising from Cold, called Chilblains, &c.?

A. These are the same with Burns, though proceeding from an opposite Cause, namely,
an

an Inflammation with Heat, Tumor, Redness and Pain, from an Obstruction of the Vessels too much contracted, and an Inspissation of the Humours congealed and rendered impervious by the Cold. These may be therefore commodiously distinguished into the same Degrees with Burns; but their Treatment must be very different from those of other Inflammations, since the Application of things actually warm proves of the worst Consequence, by causing an Ulceration, Gangrene or Sphacelus. In the first Degree therefore of this Disorder, while the Skin continues whole, only distended, with a troublesome Inflammation and Itching, it is most advisable to rub the Part with Snow or cold Water, and to avoid bringing them to the fire as much as possible; and afterwards may be applied *sp. vini camph. cum theriaca ol. petrae, bals. sulph. &c.* then the Patient may be put to bed, and sweated gently by internal warm Medicines. In the second Degree tending to Suppuration, *ol. cerae bals. Peruv. tinct. aloes, myrrhae, &c.* will be proper to deterge and heal with, applying a Compress dipped in *aq. calcis cum sp. vini camph.* But when a Gangrene or Sphacelus takes place, a Separation must be procured, or an Amputation made,

made, as was before observed in speaking of a Gangrene.

Q. 78. Why is a Scar unavoidable in great Burns?

A. A Scar, as we observed before, is an insensible, imperspirable and callous Substance, supplying the place of the Cuticle; but the Cuticle cannot be regenerated in great Burns, because the reticular Body of *Malpighi* is destroyed, from whence the Cuticle immediately arises: but if the mucous Body of *Malpighi* remains entire, while the Cuticle is separated from it into a Blister, such a Burn may be easily cured without a Scar. But when a Blister-Plaster, Pustules of the Small-Pox, &c. do not only destroy the Cuticle, but likewise the soft mucous Body expanded under it, together with the nervous Papillæ of the Skin, a Cicatrix is unavoidable, and the Skin is in that Part less sensible and perspirable.

Q. 79. What is a *Contusion*?

A. A Contusion properly is an Assemblage of small Wounds or Ruptures of the Vessels made by some obtuse Instrument, while the outer Integuments remain whole: otherwise,

if

if the Integuments are divided, it is rather a contused Wound. It is also termed an Ecchymosis or Extravasation of the Humours into the cellular Membrane and adjacent Parts.

Q. 80. What are the Consequences of a Contusion?

A. These vary according to the degree of Injury, and nature of the Part injured. If it be slight or superficial, an Ecchymosis or black and blue Spot follows from the Blood extravasated, which is often dissolved into Lymph, and dispersed in time without further Injury. If an Artery be contused, a true or spurious Aneurism may follow, Varices and Hydatides in the Veins, Ganglions in the Nerves and Tendons, whence a Palsy, Gangrene, or withering in the Muscles, a Scirrhus or Cancer in the Glands, an Abscess or Gangrene in fleshy Parts, and in the Viscera; or even sudden Death, when it proceeds from a Concussion of the Brain, as also from a Blow on the Stomach, Diaphragm, &c. in the Bones a Caries, a Laceration and Corruption of their Medulla and spongy Heads, &c. From which Considerations one may foresee the Danger and Events of Contusions.

Q. 81. How do you treat a *Contusion*?

A. I first endeavour to disperse the extravasated or displaced Humours to prevent a Suppuration; and if this is not practicable, I endeavour to promote a Suppuration, and prevent a Gangrene. The first I endeavour to procure by relaxing the Vessels, in general by repeated Bleeding, with cooling Purges; and in the Part itself, by the use of discutient antiseptic Fomentations and gentle Frictions; with plentifully diluting internally at the same time with Decoctions or Infusions of the opening Roots, with Nitre, Honey, saline Draughts, *sp. nitri*, mild Acids, &c, which resist Putrefaction, attenuate and preserve the Humours in their sound State. And these Methods I prosecute more vigorously; as the Contusion is more violent, and in a Part of the greatest Consequence.

Q. 82. How are the extravasated Juices dispersed by these means?

A. It is the nature of the red and yellow ferous Globules of the Blood to dissolve into smaller lymphatic ones, thirty-six times less than the red ones, barely by rest, provided their globular Fabric can be preserved from Putrefaction; so that the red and yellow
Parts

Parts of the Blood, which were in this Disorder forced either out of the Vessels into the cellular Membrane, or into the lymphatic Vessels (where stagnating they discolour the Part) dissolving by degrees, they become small enough to pass through their including Vessels into the common Circulation; so that a slight Contusion will in this manner of itself gradually disperse in time, as the Colour of the Part changes from a red to a black or livid, thence to a yellow more or less deep, in proportion as the Dissolution or Return of the red Globules takes place.

Q. 83. What topical Applications do you make use of, to prevent Suppuration in Contusions?

A. Such as preserve the solid Fibres and Vessels from Dissolution, by rendering them more compact, and able to sustain the Impulse of the Humours, till the latter are attenuated; such as *sp. vini campb. aq. calcis acet. litharg. ung. opodeld. vin. calid. cum sal. ammon. crud. &c.* These will be greatly promoted by gentle Frictions assisted with Compressure, provided the Inflammation be not violent.

Q. 84. How do you proceed, if this Method does not disperse the *Contusion*?

A. If the Part be superficial, and a Suppuration is already begun, I endeavour to forward it by the repeated application of emollient Cataplasms, *ex rad. lil. alb. ceparum, ficibus, lini sem. micis panis in lacte coctis, &c.* mixed with a little of the warm Gums, and some Oil or fresh Butter, and kept constantly warm upon the Part, till the Tumor forms a white Point, in which I make an Incision to discharge the Matter, deterge and heal as in other clean Wounds.

Q. 85. What is a *Wound*?

A. It is a recent and bleeding Division of the Continuity in any soft Part, by some hard and sharp Instrument. If this happens in a single Point only, it is called a Puncture when small, otherwise a Stab when large: and if the Division is made in a hard Part, it is called a Fracture, when from an obtuse Instrument; but when the Division either of Bone or Cartilage is made by a sharp-edged Instrument, it is commonly termed a Wound of them. Otherwise a Wound may be defined more generally any recent Solution of Continuity in a vascular Part, whether from

an

an external or internal Cause; and in this Sense Contusions and internal Hæmorrhages come under the Definition of Wounds.

Q. 86. How many Kinds of Wounds do you make in general?

A. They are primarily four; (1.) *Compleat*, where the Skin or common Integuments are divided. (2.) *Incompleat*, commonly termed an *Ecchymosis*, in which Vessels are divided, while the Integuments remain entire: and (3.) the *Compleat* are again either *Simple*, unattended with any violent Symptom; or (4.) *Complicated*, when accompanied with a Fracture, Contusion, Laceration, Poison, &c. — Wounds are again distinguished from the Part in which they are seated, as of the Integuments, Arteries, Lymphatics, Muscles, Tendons, Nerves and Viscera; of the Head, Neck, Thorax and Abdomen. Hence they are again distinguished into Curable, Doubtful, and Incurable, according to the Nature and Importance of each Part or Viscus, with the Circumstances of the Wound, &c.

Q. 87. What are the Signs and Stages of a compleat simple Wound?

F 3

A. As

W. A. As these are always superficial, penetrating no deeper than the common Integuments and muscular Flesh, the Symptoms which attend them while recent, in a good Habit, are (1.) a slight Hemorrhage, which ceases as soon as the Vessels, by their contractile Nature, have their Orifices compressed, either naturally by shrinking into the divided Parts, and being secluded by the congealed Blood; or artificially, by Compressure, Ligature, Styptic, &c. (2.) As the Vessels gradually contract, the Discharge becomes by degrees less bloody and more serous; the divided Lips turn back, and become slightly inflamed usually in about twenty-four hours after its Infliction. (3.) This serous Discharge in a day or two after becomes more incrustated, but still serous, acrid, and often foetid; and this continues usually two or three days, under the denomination of Ichor; and at the same time, if the Wound be of any considerable extent, a slight Fever attends. (4.) The Discharge now (about the third or fourth day) becomes less, appears thick, tenacious, uniform, and like Cream, under the Denomination of Pus or Matter; and while this Appearance continues, the Cavity of the Wound fills up with little Granulations of the sprouting
ing

ing fleshy Fibres like Snails Horns, which proceed from the Circumference towards the Center, till the whole is incarned or filled up.—Thus the Progress of a Wound is distinguished into four Stages. So long as the Hemorrhage or ichorous Discharge continues, the Wound is said to be *crude*; when an uniform laudable Matter appears, and takes off all the dead Extremities of the Fibres and Vessels which have been corrupted by the Air, it is said to be in a State of *Digestion*; and when the Surface of the Wound appears of a clean red without Inflammation, and its Cavity begins to diminish by the sprouting ends of the Fibres, the Wound is said to be in a State of *Incarnation*; and finally, after the Wound is filled up, the Skin and Cuticle, extending themselves from the Margin, by degrees spread over the whole, when the Wound is said to be in a State of *Cicatrization*, which compleats the Cure. But these two last, namely, Incarnation and Cicatrization, take place only where there is a loss of Substance.

Q. 88. How do you treat a simple recent Wound without loss of Substance?

F 4

A. If

A. If there are no foreign Bodies to be removed, I have nothing more to do than close the divided Lips, retain them in their natural Situations, and prevent the luxuriant sprouting of the Fibres into a fungous or proud Flesh above the surface of the Skin, whence the Part might be increased beyond its natural Bulk.

Q. 89. How do you accomplish these Intentions?

A. By a judicious and careful replacing of the wounded Lips, agreeable to the natural Uniformity of the Part, by my Fingers; afterwards by retaining them in that Posture, by one kind or other, either of the true or of the dry Suture, assisted with suitable Compress and Bandage, dressing only with dry Lint, or some mild Balsam spread on Lint, to exclude the Injuries of the Air; taking care at the same time either to bleed and cool the Patient, or to warm and invigorate, as they are either robust, plethoric, and disposed to Inflammation, or old, weak, and disposed to gangrene; not neglecting a proper Diet and Regimen, if such shall be found necessary.

Q. 90.

Q. 90. How is Digestion carried on, and of what use is it in a Wound?

A. Laudable Matter is formed of the Chyle and serous Juices, extravasated from the wounded Vessels, digested and changed by the Heat of the Part, and well secured from the external Air by some Plaster or other Dressings, otherwise it would be corrupted by the Air. The use of this Matter when laudable, is to deterge and separate the impervious, dead, and lacerated Ends of the Fibres and Vessels, that they may afterwards unite with each other; and therefore laudable Matter is so far from injuring a Wound, that it serves both to incarn and consolidate it; though some, from an erroneous Opinion of its being offensive, are so scrupulously exact in wiping it off, that they thus retard the healing of the Wound, almost as fast as it advances by Nature.

Q. 91. How is Incarnation or Loss of Substance supplied in a Wound?

A. This is not the Effect of any sarcotic Medicine, as was formerly imagined, but is produced merely by a Germination of the smallest vascular Fibres and Vessels themselves; for we see that the Vessels not only
unite

unite regularly with each other, Arteries with Arteries, Veins with Veins, and Nerves with Nerves, but also that their Branches are extended, elongated, and renewed; as when one Branch of a Tree being cut off, another grows out in its place. How Nature performs this, is not easy to say; but it seems to be a just Apposition of the earthy and gelatinous Matter, which compose the proper Substance of an animal Body: and this being applied successively to the sides and ends of the wounded Vessels, is by degrees as it were wire-drawed or made hollow as the Vessel advances, by the Impulse of the Humour urged on behind by the Force of the Heart and Arteries. Thus may a small Artery be elongated to any degree, till it meets and is resisted by some other Vessel; but if that Vessel which it meets is an Artery, it cannot unite with that, but will turn out of the way, because of their opposite Motions and Impulse of their Humours: but it no sooner meets with a divided Vein, but they unite together, and the Humour urged on by the Artery, finds a ready Course through the Vein. And thus is the Circulation continued by new Vessels formed in the regenerated Flesh, which supplies the lost Substance,

stance; only the Vessels are fewer in proportion than at first. But the Nerves are not so perfectly renewed as the Blood-vessels; and therefore such regenerated Flesh has scarce any sense of feeling.

Q. 92. What Precautions are to be taken to procure a laudable Incarnation?

A. To supply the Patient with nutritive and mild Aliments of an easy Digestion, and to regulate the Circulation of the Blood, so as to be neither impetuous nor deficient; for in the first Case the nutritious Juices will be impelled forward so swiftly and violently, that the wounded Vessels will be over distended, proud Flesh will be formed, and the Parts inflamed, or suffer a Dissolution instead of a laudable Incarnation: in the last Case, if the Humours are not impelled with a due force, the Vessels will not be renewed by them, but the wounded Lips will be pale, flabby, and disposed to Gangrene; and therefore a moderate Redness without Inflammation in the Wound, with a moderate quantity of good Matter, are the best Signs of a laudable Incarnation. From what has been said, the pernicious Effects of strong Liquors, high seasoned Foods, &c. in case of Wounds, must be sufficiently apparent.

Q. 93.

Q. 93. How do you cicatrize the Wound, and keep it level?

A. After the Wound is filled up, I dress only with dry Lint, and use a proportionable Compressure by Bandage to keep it upon a level; or else I apply Lint dipped in *alcohol vini*, saturated with *colophonium nigrum* or *Fryer's Balsam*; observing when necessary to take down the Margin, next the Skin, by Escharotics. But no Method will suffice, without a moderate Resistance given by Compress and Bandage, which alone with dry Lint will procure a Cicatrix much more uniform and slightly, than when any Caustic, Styptic, or astringent Application is used. That the Cicatrix begins to form, I know from the spreading Whiteness and more Compactness of the Margin of the Wound advancing towards the Center, while other whitish Specks appear spreading on the Surface towards the Margin.

Q. 94. What Wounds are to be united by Suture?

A. Such only as are recent, free from foreign Bodies, loss of Substance or Inflammation: but in Parts which are very apt to contract, a Suture may be useful only to retain them

them together, and prevent their flying back from each other.

Q. 95. What *Sutures* do you make use of in Practice, and how are they performed?

A. *Sutures* are either true or bastard; the last, made without a Needle and thread, is commonly called dry, as the former is called the bloody Suture: the first is made with a Needle and thread, and the dry Suture is made with sticking Plasters. The dry Suture, absurdly so called, is only fit for superficial and even Wounds, especially in the Face, Neck, or some other Part in sight; whereas if the Wound be deep, or the Distraction of the Parts great, it will be necessary to use the true Suture with a Needle and thread, assisted with Compress and Bandage. The dry Suture then is made with Diachylon or Diapalma Plaster, mixed with a little Turpentine, spread on Leather, and cut in the shape which best suits the Part, usually in slips, placed at a small distance from each other, as in *Tab. C. Fig. 1.* or, according to *Petite*, with small holes in the middle of them, that the wounded Lips may be seen, and treated with proper Remedies. Before the Application of either of these Sutures,

tures, (as represented in *Tab. C. Fig. 1. a, b, c.*) we are to observe, 1. that the Hair be shaved off; 2. that the Emplaster be of a due Consistence; the older and thinner spread, the better it holds, and especially when spread upon coarse Linen; 3. to make them of a due length, to extend a considerable way upon the sound Skin, in order to hold the more firmly; and to place them so, as to give a free discharge to the Matter.

Q. 96. How many Kinds of the true Suture do you make?

A. Sutures are from their use distinguish'd into Incarnative, Retentive, and Restrictive. These are again distinguished into Simple and Compound; under the first come the interrupted, the glover's, and the twisted Suture. The *interrupted Suture* is made by passing a strait or crooked Needle, armed with a waxed thread, through the wounded Lips approximated together, observing to enter the Needle at a sufficient breadth from the Wound, that the stitches may hold fast. This being repeated at proper distances, the Needle is taken out, and the threads tied together, beginning first with the middlemost, and so proceeding to each end. The threads are
first

first tied in a simple knot, and after drawing them together, they are tied again over a Compress with a slip-knot. The stitches may be an inch more or less distant, according to the nature of the Wound; see *Fig. 4. Tab. C.* The *quilled Suture* is made by sewing Quills or pieces of Emplaster rolled up to the margin of the Wound, as represented in *Fig. 5. Tab. C.* the loop of the thread being placed round one Quill, the Needle and thread is then conveyed through the Lips of the Wound, and tied upon the other Quill *a*, at *c*. This was much in use with the Ancients, but is at present rejected. The *twisted Suture* is seldom used, but in the Hare-Lip; and it is made by thrusting one or more Needles through the Lips of the Wound, twisting the thread round each Extremity, as represented in *Fig. 8 and 9. Tab. C.* The *glover's Suture*, *Fig. 7.* which is commonly used for Wounds of the Intestines, is made with a fine Needle threaded with silk, the stitches being made at about a tenth of an inch distance from each other, by carrying the thread round in the same manner as a Glove is usually sewed, and as represented at *Fig. 7. Tab. C.* But in general it is to be observed, that Sutures should never

ver be used where Compress and Bandage will suffice, as in most Cases they generally will, except in angular Wounds, and then the interrupted Suture recommends itself, as being made by the fewest stitches. To these may be added the Suture of a Tendon; but it is found by Experience of late, that if the Limb is retained in such a Posture, as to keep the Extremities of the divided Tendon together, they will unite as well or better without than with a Suture, and therefore Compress and Bandage are in this Case also preferable.

Q. 97. What do you understand by a *complicated* Wound?

A. One that is either venomous, contused, or attended with some violent Symptom, or Injury of a large Blood-vessel, Nerve, Tendon, Bone, &c.

Q. 98. Which do you make the least *complicated* Wound?

A. One that is attended only with a loss of Substance in a soft, superficial or muscular Part.

Q. 99. How do you treat such a Wound?

A. In

A. In this Case it would be in vain to attempt to unite the Lips either by Suture or Deligation, till the loss of Substance is supplied; and therefore I am to wait and keep it under the Treatment of a simple Wound, till Nature has supplied the lost Substance, keeping the Patient in a proper Regimen, and the Surface of the Wound defended from the Air with some soft vulnerary Balsam applied upon soft Lint, very loosely retained, that the Extremities of the Vessels and Fibres may be kept in a soft and yielding State; and being careful not to obstruct the repullulating Granulations of Flesh by too strict a Bandage, nor to irritate them by abrading the gelatinous Mucus, which naturally restores, and adds to the growing Parts; and therefore it is better to take off the Matter, by absorbing it with scraped Lint, rather than by wiping the Surface. But if any Part of the Wound appears fungous or discoloured, that must be deterged with the Application of some Digestive, agreeable in Strength to the Quantity and Hardness of the Fungus or discoloured Part; such as *pulv. myrrhæ & aloes, vitriolum Rom. vel merc. præcip. rub. per se, vel cum ung. digest. aqua phagædenica, &c.* In the mean time the Patient must keep to a nutri-

tive and eupeptic Diet, avoiding all fermenting Liquors, except in case of Weakness; Rest and Sleep are to be indulged, and the latter is to be procured by Anodynes, if wanted; and I observe to keep the Bowels open with Laxatives, if they are not so naturally.

Q. 100. What are the usual *Symptoms* which attend a large complicated Wound, and how do you treat them?

A. These are principally Hæmorrhage, Pain, Convulsions, and Fever. The first, if moderate, and in a young full Habit, may be allowed, to prevent Inflammation, and worse Consequences; but if profuse, or from a Wound in some large Artery, if it be accessible, the Hæmorrhage is to be suppressed, either by totally dividing the Artery, that it may contract and be compressed within the soft Parts, as in Wounds of the temporal, cubital, and tibial Arteries; or by making a Ligature on the Artery with a crooked Needle and waxed thread, which is the surest and best way; but for the present it may be suppressed by the Tourniquet, till the Ligature can be made.

Q. 101. What Method do you take when the wounded Artery is not accessible?

A. If

A. If the Artery can neither be compressed, totally divided, nor contracted, by the Application of Alcohol or other Styptics, as happens in Wounds of the internal Arteries; in that Case the Patient seldom bleeds longer than to faint away, and then Ligatures are to be applied to the Limbs, to retard the Motion of the Blood; the Patient is to be conveyed to some cool and still place, and in that manner to be kept two or three days, carefully avoiding all cordial and stimulating Medicines, and supplying him only with Whey, very thin Broths, &c. for fear of renewing the Hæmorrhage. But in superficial Hæmorrhages, or those which happen in some Cavity, as the Socket of a Tooth drawn, or when a Bone is near, &c. the space may be filled with dry Lint, or Lint dipped in *alcohol vin.* made hot, or in Water, in which has been dissolved *Vitriolum Rom.* drying it afterwards; or, in some Cases, by injecting Alcohol, as in case of a profuse Hæmorrhage at the Nose, from a Rupture of the Arteries, which pass through the Os cribriforme, with the olfactory Nerves, &c. or for the same purpose may be used the *Helvetian Styptic*, which is a Tincture of Steel in *French Brandy*. But Styptics and Cauterics should never be used

to suppress an Hæmorrhage, when Ligature or Compressure can take place.

Q. 102. Which of these Ways do you prefer for suppressing an Hæmorrhage?

A. That by suitable Bandage and Compresses or Bolsters appears to be the best and most natural Method, when the Artery runs along the side of a Bone. Nor is it necessary to compress the Artery so far, as totally to occlude its Passage to the Blood, but only to impede its Efflux, and retain the Thrombus, so as to grow to the sides of the divided arterial Coats. But this requires great Judgment, not to let the Compressure be too small, to prevent an Aneurism. But if the wounded Artery lies within a Bone, which prevents its lateral Compressure, in that Case the only Means remaining is to apply dry Lint, and retain it forcibly against the divided Orifice.

Q. 103. How do you remove the *Pain* and symptomatic *Fever* in Wounds?

A. Pain seldom happens to so great a degree from the natural Contraction of the divided Parts, as to require a separate Treatment, unless the Part be nervous or tendi-

nous,

nous, contused, inflamed or irritated by some foreign Body ; and therefore the first Enquiry must be, from which of these immediate Causes the Pain and Fever proceed : the foreign Bodies are to be removed, the Inflammation is to be allayed by bleeding, with cooling, internal and topical Remedies, emollient Cataplasms, &c. But if the Part be either Nerve or Tendon, nervous or tendinous, the Case is often dangerous, and *Convulsions* or Death the Consequence, unless the Nerve be totally divided, or the Tendon kept relaxed ; which must be therefore put in practice to save the Patient, if other Methods will not suffice ; even though this may induce a Palsy or withering of the Part. But first it may be proper to try the warm Balsams, and endeavour by suitable Dressings to take off the Distraction as much as possible from the Part ; which Distraction being removed, the Fever, Convulsions and other Symptoms consequently vanish.

✓ Q. 104. But what Method do you take, when *Convulsions* follow from too great a loss of Blood, instead of any of the fore-mentioned Causes ? (Q. 103.)

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A. In that Case, as the Heart is not duly supplied with Blood, and the Arteries do not force it sufficiently into the Brain and Cerebellum; strait Stockings and restrictive Bandages are therefore to be applied to the Limbs, and the Abdomen is to be swathed, while in the mean time the Patient is supplied with Broths, Whey, &c. after being revived by the Application of Volatiles to the Nose, or Cordials internally, if there is no danger of their renewing the Hæmorrhage.

2. 105. What are the Consequences of a large Artery or Nerve being divided?

A. If the first does not induce a fatal Hæmorrhage, the Parts below the Wound being no longer supplied with Blood, unless they are furnished by other Arteries, must consequently either mortify, or wither and dry up; and if partially divided, it causes an incessant Hæmorrhage, or an Aneurism. But if a large Nerve be totally divided, it at first brings on excruciating Pain and Inflammation, by its contracting and stretching the other Branches communicating therewith; and afterwards the Part becomes paralytic, and either withers, or else is consumed by a Mortification; for the Arteries being no longer
able

able to propel, or circulate their contained Humours for want of the Nerves which supply their Coats, the Humours are accumulated, stagnate, corrupt, and mortify the Part. — But if the Nerve, or even a Tendon be only half divided, there follows a continual and slow Laceration, a spreading Inflammation, excruciating Pain, Fever, Delirium, Convulsions, &c. with a Gleet, or thick ferous Discharge; which Symptoms are in proportion more violent, as the Nerve is more distracted or stretched; and therefore here, as in the Artery, a total division of the Nerve or Tendon, or an Amputation, must often be made to save the Patient; though we may first try the Application of a little Balsamum Peruvianum dropped warm into the wounded Tendon, with suitable Bandage to take off the Distraction. This holds true likewise in membranous or nervous and tendinous Parts, as well as in the Nerves and Tendons themselves.

Q. 106. What is the Nature of contused and Gun-shot Wounds?

A. These are always much more difficult to cure than an incised Wound even with less of Substance, because here the Fibres and

Vessels being lacerated, their Juices extravasated, and their Fabric destroyed, makes a large Digestion or Suppuration previously necessary, to remove the morbid Parts, before the Wound can be inclosed and healed; and hence also the Symptoms of Inflammation, Pain, &c. are commonly more violent in contused Wounds. They are more or less dangerous according to their Extent, and the Part in which they are seated. Those which extend into the Bones, Viscera or Joints, are of the worst kind; and especially when any of the Wadding, Cloths or Splinters are carried into the Part together with the Ball; for the Consequences in these Cases must be Inflammations, Gangrene, Caries, &c. which make an Amputation necessary. But Gun-shot Wounds in the Cranium are above all the most malignant and fatal; though we have often surprising Instances of Cures made by Art and the Efforts of Nature, even here when the Case has seemed desperate.

Q. 107. How do you treat Gun-shot Wounds?

A. My Intentions are in the first place to suppress the Hæmorrhage; (2.) to extract all foreign Bodies, dead Flesh, Splinters of Bones, &c.

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&c. (3.) to deterge or digest the Wound; and (4) to incarn and cicatrize. The first Intention is to be answered by the Fingers if possible, otherwise by Pliers, suitable Instruments, or a counter-opening, according to the Nature of the Circumstances; carefully avoiding the Nerves, Tendons, Ligaments and Blood-vessels in enlarging the Wound, or making the counter-opening. But if the Bullet be smooth, inaccessible, and lodged in a soft muscular Part, or in some Cavity of the Body, I often leave it behind, rather than extract it to the Patient's detriment; for we have frequent Instances of their making their own way out afterwards to the Skin, without Pain or Injury. In extracting a Ball by the Forceps (*Tab. III. fig. 11.*), they are not to be opened till their ends touch it, the Patient being at the same time held in the Posture which he was in when it entered. If it sticks in the Bone, I extract it by the Terebra, represented *Fig. 3. Tab. B.* If the Bone or Joint is much shattered by the Ball, as the Consequences must be fatal, I make an Amputation as soon as possible; but if the Bone remains entire, or little injured, after removing the Fragments I forward the Suppuration by the common digestive Ointments; afterwards
deterge

deterge with *myrrh*, *aloes*, *præcip. rub.* &c. (avoiding this last when the Nerves lie bare) and then I incarn and cicatrize. If I perceive a spreading Mortification in the soft Parts, I prescribe limits to it with a Pencil-brush dipped in *oleum vitrioli*, or in a Solution of *argentum vivum in aqua fortis*, diluted afterwards with water. This is sometimes the only Resort, as when a Mortification has extended to the Scapula; and it is likewise often of use in a Caries of the Bone: but, like other Corrosives, it requires Judgment in its Application, to avoid the Nerves, Tendons or Ligaments; and therefore I never use such in the Joints, where it is more advisable to scarify deeply, and apply a warm Mixture, *ex ol. tereb. theriac. sp. vini camph. bals. Peruv.* &c. — In the mean time I bleed the Patient at intervals, according as the Symptoms indicate, giving internally *tinct. vel extr. cort. Peruv.* to which may be added in case of Weakness, the *confectio Raleighian.* vel *Fracast.* &c. After the Wound appears perfectly clean, and affords a laudable Cream like Matter, as it incarns I take care to keep the divided Parts as much in Contact as possible, by keeping the Patient in a suitable Posture, and applying suitable Compress and Bandage,

Bandage, determine to act from the bottom upwards.

The Importance of being more particularly acquainted at this Juncture with the proper Methods of treating Gun-shot Wounds, will be Excuse sufficient for inserting the following Extract from Mr. *Ranby*, whose superior Judgment and Experience in these Matters must be allowed unexceptionable.

“ The first Intention, in regard of Accidents caused by a Musket or Pistol-Ball, is, if possible, to extract the Ball, or any other extraneous Body that may be lodged in the wounded Part. And whenever these Casualties are attended with a great Effusion of Blood, from the Rupture of some considerable arterial Vessel, it will be absolutely necessary, with all imaginable dispatch, to restrain the bleeding, by taking up the Artery with the Needle: and, at the same time, to be particularly careful that your Hold prove no ways elusive. There is no depending on any Applications, however styptic, on these occasions.—In order to get at the Ball, or any other foreign matter that infects the Wound, I would advise probing or poking to be used as sparingly as possible; having constantly experienced,

perienced, through the whole Course of my Attendance in these Cases, that such a Conduct is highly detrimental to the Patient. And, indeed, where probing is necessary, I would always prefer the Finger as the best and truest Probe. — If a Ball or any other Body happens to be lodged near the Orifice, or is perceptible by the Finger to lie under the Skin, though at some distance from the Mouth of the Wound; in the first Case it is requisite immediately to remove such extraneous Matter: and, on the other occasion, to cut upon it, and take it out. But when it is sunk deep, and lies absolutely beyond the reach of the Finger, I could never bring myself to thrust those long Forceps the Lord knows where, with scarce any probability of success. — A great number of Instances have occurred to me, where Balls have been quietly lodged in the Body; till, after many years, they have worked themselves a passage towards the surface, and were consequently very easily extracted. — In case the Wound be occasioned by a Musket or Pistol-shot, and consequently but small, it will be altogether necessary to dilate it without delay. Yet, I think, in Wounds near a Joint, or in very membranous or tendinous Parts, the
Knife

Knife as well as Forceps should be put under some restraint; nor any more opening made, than what is absolutely requisite for the free discharge of the Matter lodged within. Wounds in the Joints are always dangerous, let them proceed from whatever Cause, whether from a Bullet, or any cutting Instrument: and membranous or tendinous Parts must, past dispute, suffer from their being thus exposed to the very sensible Impressions of the Air.—I could produce many Instances of Balls going through muscular Textures, and the Wounds being healed with very little trouble. And I have known Wounds of the Skull from a broad Sword, (where both Tables have been cut through, and a considerable Piece loosened) having been suffered to bleed for several hours, to do well; nor to be attended, or at least very seldom, with any feverish Complaint. Which I am apt to attribute to the great quantity of Blood lost immediately after the Parts had been injured. — If the Ball has gone quite through, both Orifices are to be widened, (if in a Part where it can be done with safety) and particular Care is to be taken to preserve both Openings; that especially which is the most depending. No Tents are to be made use of,

of, where there is any possibility of avoiding them: and I would in general recommend light, easy Dressings, with a slight, moderate Bandage, just sufficient to keep them on the Part. Thin Flannel is what I would prefer, in case it can be got. — Where the wounded Person has not suffered any great loss of Blood, it will be advisable to open a Vein immediately, and take from the Arm a good large quantity; and to repeat bleeding, as Circumstances may require, the second, and even the third day. This timely Precaution will prevent a good deal of Pain and Inflammation, forward the Digestion, and contribute towards obviating a long Train of complicated Symptoms, that are wont otherwise to interrupt the Cure, miserably harass the poor Patient, and too often endanger his Life. — For the first twelve days it will be proper to observe a cooling Regimen, both in respect of the Medicines that may be prescribed, and the Diet requisite for the support of Nature: and as, in Circumstances of this kind, 'tis necessary the Body should by all means be open; a Stool should be every day procured, either by emollient Clysters, or some gentle Laxative taken in at the Mouth. — Whatever Application is of a hot, spirituous

ous nature, I find remarkably injurious on these occasions, and what no wounded Part can in any degree bear. Let the first Dressing be with Lint, dry, or moistened with a little Oil, and a very light Bandage; the next with a Digestive warmed, and over it the Bread and Milk Pultice, mixed with a sufficient quantity of Oil to keep it moist: and, where there is a great Tension, and the Wound large, a Fomentation. And this Course is to be continued, till the Sore is clean; and then it is to be healed according to Art. This Method will commonly promote a constant, easy Perspiration, abate the Pain, very much facilitate the Digestion, and remove all Apprehensions of any approaching Inflammation. What induces me to moisten the Lint with Oil, is the Ease that is procured to a contused Wound from such an Application, in comparison of one of an absorbent, drying disposition; which, instead of giving free liberty to the sanious Blood to discharge itself, and consequently preventing an Inflammation by unloading the Part, would possibly obstruct the Mouths of the capillary Vessels, and hinder Nature from getting rid of that Incumbrance, which 'tis observable she very much affects to throw off.—Should

an Inflammation seize any Part, through the Lodgment of a Bullet, or any other foreign Body, that could with safety have been more immediately extracted; all Attempts for dislodging such extraneous Matter should be postponed, till the swelling has in some measure subsided, and the inflammatory Disposition of the Fibres is nearly vanished: unless the Ball, or other extraneous Body, lies at no great distance from the Orifice; and there is, on that account, a Certainty of removing this Incumbrance without any material trouble to the Patient. — If a Wound be of such a desperate nature, as to require Amputation, (which is often the Case, when it happens in any principal Joint) it would certainly be of consequence, could the Operation be performed on the Spot, even in the Field of Battle: lest by adjourning it an Inflammation, which one may very reasonably expect, should obstruct a Work, that ought rarely to be entered upon during the Continuance of so calamitous a Circumstance. The neglecting this critical Juncture of taking off a Limb frequently reduces the Patient to so low a State, and subjects the Blood and Juices to such an alteration, as must unavoidably render the subsequent Operation, if not entirely

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ly unsuccessful, at least exceedingly dubious. And in Wounds, even where no Amputation is required, 'tis equally advisable not to defer the Care necessary to be taken of them; lest, by the Parts being exposed to the Air, there might arise a Series of very dangerous Symptoms. — Wounds, that border on any considerable Artery, are very apt to bleed afresh upon Motion, or the Return of a free Circulation of the Blood into the Part, which was interrupted at first by the Violence of the Injury offered it: and this is almost always the Case, when the Slough begins to separate. For which reason, one should never attempt to remove it by force; but wait with patience, till there be a perfect Separation of this Slough: nor be in the least wise shocked at the Accident of Arteries thus opening themselves, which a very moderate Experience will convince one to be almost inevitable. The Patient frequently gives warning of what is coming upon him, by complaining of great Weight and Fulness in the Limb, which are ever accompanied with more or less Pulsation in it: an infallible Prognostic of the Consequences. Let the Wound afflict whatsoever Part, if these Complaints attend it, I instantly enjoin bleeding and the

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Bark.

Bark. I have known several Instances of Persons losing their Lives from the starting of an Artery, before the Surgeon could reach them; particularly where there has preceded an Amputation. And I dare affirm, the quantity of Blood lost in some Cases which I have observed to kill, has not amounted to twelve ounces: which I don't know how to account for otherwise, than by the Drain which had been made from the Mass of Blood both before and during the Operation. Whence a sudden Gush, though of so moderate a portion of Blood, after the great quantity already lost, gives a check to the Circulation, and causes immediate Death. This Reflection, I think, ought to be a Lesson of Instruction to every Practitioner, to be particularly intent on the faithful Discharge of his Duty in regard of tying the Vessels. — Repeated Bleedings in the beginning draw after them many Advantages. They generally prevent, and always lessen, any feverish Assaults, and seldom fail to obviate Impostumations. The Body must ever be kept in a laxative State; and, when Pain puts it on the rack, immediate recourse must be had to the sovereign and almost divine Powers of Opium. — Next to this I likewise add the
Bark,

Bark, a Medicine which no human Eloquence can deck with Panegyric proportionable to its Virtues. Of such incomparable Benefit it is to Mankind! — I have known it procure Rest, if given in large Doses, when even Opium had been taken without any manner of effect. In all large Wounds, especially those made by a Cannon-ball, there is constantly a great Laceration of the Membranes, and Parts endued with an exquisite Sensation. And these are ever attended with an excruciating Pain, and a Discharge of a gleety Matter; which, if not restrained, proves often of the last Consequence. In this unhappy State, the Bark given in doses of a dram each, and repeated every three hours, (or oftener, if the Stomach will bear it) with surprising Efficacy repairs the Breach made in the Constitution by this terrible havoc. Elixir of Vitriol, taken three times a day, in a glass of water, I find to be of singular Benefit, and to prove a very good Assistant to the Virtues of the Bark. And, if the Body be costive, to each dose of the Bark I add four or five grains of Rhubarb, till that Inconveniency is remedied. Should the Bark run off by more than four or five successive Stools, I take care to check this Ef-

fect of it by ordering two or three drops of Laudanum, or two spoonfuls of the Diascordium mixture along with it, every time it is given. — Where the Sore discharges a considerable quantity of gleety Matter, is flabby, looks pale and glossy, (which Appearances are ever consequent to a loss of Substance) the Bark continually relieves the Pain that is predominant in this Case, thickens the Matter, lessens its quantity, and quite changes the Complexion of the Wound. — It is very common in cachectic and scorbutic Constitutions, for a Sore, the first eight or ten days after taking off the Limb, to promise all imaginable Success: from which time it frequently begins to gleet prodigiously, looks pale, glossy, and flabby; and, this gleeing if not checked, in a little while runs the Patient out of the World. In Exigences of this kind the Bark hardly ever fails to procure Relief, and works an apparent Change in a very short space of time: sometimes in twelve hours.

From what has been here said by Mr. Ranby, it is evident that the Bark is one of the best Remedies in contracting the Vessels, and restoring their due Action upon the Blood, when

when too great a quantity of that necessary Fluid has been lost by a profuse Hemorrhage, provided the wounded Vessels are previously closed up, or well secured from a Return of the Hemorrhage. It also not only secures the most tender Solids and small Vessels from being dissolved by the Acrimony of any Matter absorbed, and returned into the whole Mass of Blood from large Wounds or latent Abscesses; but it likewise preserves the Texture of the Blood itself from being too much broken, or rendered too watery from the same Cause, which would otherwise inevitably produce a fatal and colliquative Hætic. But where there is too great a Fulness, or too great a Strength and contractile Force of the Solids, and an inflammatory Tenacity or Siziness in the Blood, it may occasion Obstructions, Pains, Inflammations, and their Consequences, unless it be timely laid aside upon the appearance of such Effects. Where the Blood is infected with a scorbutic and saline Acrimony, as it commonly is in Seafaring People, there should be a plentiful use of *aq. calc.* previous to the Bark, to wash out the more gross, earthy and saline Parts, which might otherwise induce Rheumatisms and the most stubborn chronical Disorders.

Q. 108. How do you treat venomous Wounds?

A. Almost the only and most dreadful venomous Wound which we have to guard against in our Climate, is that from the Bite of mad Animals, whether Dog, Cat, Wolf, Ape, Man or Horse, &c. and in this Case, as in all other venomous Wounds, if made in the Extremities, a strict Ligature ought to be immediately applied, and the Part afterwards well scarified or cupped all over, especially on and near the Wound, before the Ligature is taken off; and till this can be done, the Wound and adjacent Parts should be instantly treated with the actual Caustery, which shrinks up the Vessels, coagulates the Humours, and prevents them from returning with the Poison into the Circulation: and even before this, it will be proper to open all the large conspicuous Veins next to the Ligature as soon as it is applied, that the infected Blood may be evacuated, and drawn out as much as possible from the Part. After this, to prevent further Mischief, the Patient should be sweated, cupped, and cold bathed once in twenty-four hours, and drink at least *cong. j.* in that space for a month together: but if notwithstanding this, the Symptoms

Symptoms of an approaching Hydrophobia begin to appear, the Patient must be bled largely to about 20 ounces in a day, till they abate; or if he should not be able to swallow, it may not be amiss to try to inject acidulated Juleps, and other cooling Liquors, by a small Tube thrust down the Gula. During the time of sweating, it may be convenient to rub in ʒj of the mercurial Unguent, observing to keep it under from raising a strong Salivation, by lenient Cathartics.

Q 109. How do you distinguish Wounds of the Head?

A. According to the degree of their Penetration, into such as only injure the common Integuments; such as injure the Skull and dura Mater, and those which affect the Brain itself: and as their degree of Danger depends upon that of their Penetration, therefore a strict Enquiry ought always to be first made, how far a Wound in the Head penetrates or extends.

Q 110. How do you distinguish whether the external Parts only are injured?

A. From considering the Nature and Violence of the wounding Instrument, by inspecting

pecting and searching with a Probe, and by finding the Patient free from any violent Symptom; that is, without a Vertigo, Deafness, Loss of Speech, bleeding at the Ears, Mouth, &c.

Q. III. How do you treat Wounds not penetrating the Cranium?

A. These, especially when contused, are often dangerous, and ought therefore to be carefully regarded, inasmuch as the Disorder may be propagated through the Cranium to the Brain itself; and even otherwise, from the Injury of the Pericranium, tendinous Expansions, &c. may follow a destructive Fever, an Emphysema; Oedema; Corruption of the Bone, &c. especially if the external Air be freely admitted. Being therefore assured the Wound does not penetrate, I close the bleeding Lips of the Wound carefully, and retain them with proper Bandage and Dressings, which I repeat seldom, and very expeditiously, to exclude the Air, and I carefully avoid oily, fat or rancid Medicines which foul the Bone. After the Hæmorrhage is stopped by the use of dry Lint, I dress with *mel rosarum* or *Fryer's Balsam*, retained by a sticking Plaster and moderately tight

tight Bandage, which will suffice for a simple Wound: but if there be any Contusion, an Emphysema or Lodgment of Air, an Oedema or deep Position of Serum, an Echinomosis or Extravasation of Blood, seated either of them in the cellular Membrane, betwixt the Skin and Cranium, settling towards the Eye-brows; in this Case I make an Incision in the Scalp, or else open the Wound, discharge them by degrees, and prevent their Return by suitable Bandage and Compressure.

Q. 112. How do you proceed in case of a considerable Contusion in the Scalp?

A. I first use a discutient Fomentation, *ex fol. rutæ scord. &c. cum sal. ammon. crud.* boiled in Wine, to which is added a little Camphire before it is used. If this Method does not disperse the Contusion, I endeavour to digest off the injured Parts *cum tereb. & vitel. ovi, gum elem. basilic. flav. &c.* and over these I apply a Flannel dipped in the discutient Fomentation. Such Parts as are not digested off by this means, I remove by the Scalpel, being careful to avoid exposing the Pericranium, by preserving the Skin as much as possible, and perfectly discharging all

all the Matter, Sords, or other Humours; treating it afterwards as before in Q. 111.

Q. 112. What are the Consequences of a Wound injuring the Pericranium, and exposing the Skull?

A. Since this Membrane is the Periosteum supplying the nutritious Vessels into the Bone of the Skull, if that be separated, and the Bone exposed to the Air, the Circulation will be destroyed through the exterior Lamellæ, whence the Humours will stagnate, corrupt, and foul the Bone, which will therefore exfoliate or throw off the dead and discoloured Scale or Lamella, which is more corrupted, in proportion as it appears of a darker Colour; and as this Foulness is the Effect chiefly of the Air drying up and destroying the Vessels which run betwixt the Fibres of the Bone, so it will be necessary to procure or hasten an Exfoliation of that Lamella, which is now become dead, and, as a foreign Body, retards the Cure, and spreads the Disorder, as long as it continues adhering to the living Parts.

Q. 113. How do you procure this Exfoliation?

A. This

A. This is performed by Nature, of the Motion and Dilatation of the living Vessels next under the corrupted Lamella, which is by the Vibration of the Vessels gradually raised and separated. But as this advances so slowly as to take up above a Month, when left to Nature alone, in which time the Disorder may spread, and many other Accidents happen, therefore it is advisable to hasten the Separation by Art; not by the Cautery, Raspitory or Scraper, which leaves the Work to come over again, but by perforating the exposed Bone down to the Diploe, with many small Apertures, by a common triangular Needle, or a Trepan of the like shape, by which means the subjacent living Vessels having a free Passage, will emerge through the Foramina, and form a new Periosteum, as soon as they have thrown the dead Scale off, or even without any Exfoliation at all, if the Bone is clean, as *Bellosse* judiciously observes. But while this is performing, I carefully avoid exposing the Part to the Air as much as possible, by renewing the Dressings as seldom and expeditiously as may be; excluding the injurious Air by the Application of a Pledget dipped in *Fryer's Balsam*, or by strewing over some
Farina

Farina of the Gums, and renewing the Applications in a very warm Room, if it be in the Winter season. This Method is applicable to the Exfoliation of all other exposed Bones, as well as of the Skull.

Q. 115. What Injuries may the Skull itself sustain from a wounding Instrument?

A. It may either receive a Fissure, Fracture, Contusion, Depression, or a loss of Substance; and this either in one or both of its Tables at the same time.

Q. 116. How do you discover that the Skull is thus injured by a Fissure, Fracture, &c.

A. (1.) By comparing the Nature and Violence of the wounding Instrument with the Wound itself; (2.) by inspecting and searching with the Probe or a Tooth-pick, and the dropping of Ink upon the Part, then wiping it off, and observing if any black Line discovers a Fissure; (3.) by a Looseness or Grating of the Bones, sensible to the Touch of the Finger, or to the Patient himself, if he bites hard upon any thing; (4.) from the Violence of the Symptoms; as intense Pains, Vomitings, Vertigo, Deafness, Loss of Speech, Stupidity

Stupidity or Sleepiness, with a bleeding at the Nose, Ears or Mouth.

Q. 117. When is it necessary to expose the Skull?

A. In most Cases where the Bones are injured, and in all where the Symptoms are malignant; as Convulsions, Lethargy, Palsy, Apoplexy, &c. denoting the Brain to be damaged, and that no time ought to be lost: yet I am not forward to expose the Skull upon all slight Occasions, nor even where there is an apparent Fracture or Fissure of the Bones, provided no ill Symptoms attend; at least I first try what can be done by Bleeding, Fomentations, and internal Medicines, according to the Observation of *Ruyfch.*

Q. 118. How do you raise the Scalp in these Cases?

A. By making an Incision with a gentle Pressure through the Integuments, either by cutting round a Shilling or Half-crown, and taking out a piece entirely; or else by directing the Incision in the shape of an X, V, or T, according as the Extent of the Injury and other Circumstances indicate, separating the

Obs. Anat. Chirurg. LX.

the Pericranium from the Bone with an Ivory Knife, and observing to avoid injuring the temporal and other Muscles as much as possible; and if the Case be not urgent, I leave the Wound fill'd with dry Lint, till the Haemorrhage is suppressed, to have a better view of the Parts.

Q. 119. How do you proceed when a Contusion or Fissure appears?

A. If the Bone seems discoloured and contused, I bore several small holes with a triangular Needle, (or the Point *a*, *Tab. D. fig. 1.*) through the external Table to the Diploe, in order to discharge the extravasated Humours, and make a way for the repullulating Vessels to throw off the dead Scale.

Q. 120. When do you know this Trepanation to be necessary?

A. From the Colour of the Bone, which is naturally of a pale, reddish, or pearl Colour; but if its Vessels are dead, it appears first white, and then, as it corrupts, inclines to yellow, brown, livid, and at last becomes quite black; so that the Change of Colour denotes the greater or less degree of Corruption in the Bone.

Q. 121.

Q. 121. Why is a Fissure often more dangerous, than a Contusion or Fracture?

A. Because it is more difficult to discover; whence the Bone is often neglected, under a supposition of its being sound, while the Disorder in the mean time is spreading through the Diploe, and extending to the Brain, becomes at length fatal of a sudden, when the Cause is not the least suspected: but if the Bone appears discoloured in a Fissure as in a Contusion, it must be perforated with the Terebra as before, which is much preferable to the Methods formerly used by scraping, rasping, &c.

Q. 122. What do you understand by a Depression of the Skull?

A. This is either, proper when the Bones are thrust inward without a Fracture as happens from their Softness in Children and Infants; or improper, when the Bones are indented towards the Brain with a Fracture, which must inevitably happen in Adults, from the Hardness and Inflexibility of the Bones: in either of which Cases there is a greater or less Obstruction, and a Destruction of the Vessels in the Brain; whence a Lethargy, Convulsions, Palsy, Apoplexy, and even Death

Death itself follows, without timely Relief be given.

Q. 123. How do you raise a *Depression* of the Skull?

A. After opening the Integuments in young Children, I first attempt it by a sticking Plaster, to the Center of which is fastened a Tape, whereby it is pulled up suddenly from the Bone, and acts like a Sucker, as in *Tab. D. fig. 2.*; but if the Bones are hard, in an adult Patient, I attempt it by the Screw *b*, *fig. 1. Tab. D.* or Elevatory, *fig. 3, 4. Tab. D.* or if the Fragments are too loose to sustain that Instrument, I trepan in the nearest sound Part of the Bone, and endeavour to force it from within outward by a Lever *c*, *fig. 1. Tab. D.* directing the Patient in either Case to sneeze or cough at the instant the Elevation is attempted, that the Brain, being distended with Blood and pressed outward, may assist the Elevation.

Q. 124. In what Cases, and to what Parts of the Skull do you apply the Trepan or Trefine?

A. (1.) In all Fractures where the Brain is injured, and the Symptoms malignant; (2.) for Depressions or Indentations of the Skull,

Skull, which cannot be raised without; (3.) and lastly, in all Cases where the Confusion and Extravasation in the Blood-vessels of the Brain is so great, as not to admit of being dispersed by profuse Bleeding, Purging, Blistering, Clysters, and proper internal Remedies: yet am I not so forward as some for using the Trepan upon every slight occasion, until I see what can be done by the aforementioned preceding Method; being careful in the mean time not to let the Case run too far: but if the Symptoms mentioned are urgent and inflexible, I directly proceed to trepanning, which, though a doubtful Operation, may sometimes succeed, by giving a Vent to the extravasated Humours, removing the Compressure of the Brain, and preventing Suppuration and their Consequences.

Q. 125. What Parts of the Skull admit not of the Trepan?

A. The Trepan cannot well be applied (1.) upon a Suture, because the dura Mater being inserted into the Sutures, it will be not only an extreme difficulty to raise up the trepanned Piece, but it must also lacerate that Membrane, whence the worst Consequences might follow. (2.) It cannot well be applied

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upon

upon those Parts of the occipital and temporal Bones, which are covered with thick Muscles; though in Cases of the last Necessity the Trepan has been sometimes successfully applied here, after separating the temporal Muscle from the Bone. (3.) The Trepan cannot be used upon the frontal Sinus, not only because it is opposed by the Make of the Bone here, but because it would leave an incurable fistulous Ulcer behind. (4.) We cannot trepan safely over considerable Arteries of the dura Mater, where we observe their Impressions in dried Skulls, as in the parietal Bones, &c. (5.) It cannot be applied towards the Basis of the Skull; though when the extravasated Humours are lodged there, they may be sometimes forced up to a superior Opening. All these Places are to be avoided, if possible; but when the Case seems inevitably fatal without the Assistance of the Trepan, it is better to try a doubtful Remedy than none, and, even against these Cautions, to make an Opening as near as possible to the Part injured.

Q. 126. How do you know which Part of the Brain is injured?

A. (1.) By

A. (1.) By carefully examining the Head after it has been shaved, and enquiring of the Patient or By-standers; (2.) from the spontaneous Motion of the Patient's Hand to a particular Part of his Head, even though he be senseless; (3.) from observing which side of the Body is paralytic, and which side convulsed; for the Disorder is always found on the convulsed side: but even if the Symptoms urge, the Trepan ought to be applied at discretion, first to one Part and then to another, till that affected is discovered. Thus if the Patient continues stupid, convulsed, bleeding at the Nose, Ears or Mouth, &c. and no Signs appear to direct the Trepan, it may be used upon each of the parietal Bones, upon the frontal and occipital, all round the Skull.

Q. 127. Which do you prefer, the Trepan or the Trefine?

A. As these Instruments commonly differ, not in their most essential Part, but only in the Handle, either of them will therefore perform the Office very well: but the Trep-pan having a versatile Handle, like the Borer used by Coopers, requires the use of both Hands to apply it; whereas the Trefine, ha-

ving its Handle fixed like a common Wimble or Nail-piercer, requires but one Hand to guide it round. But upon the whole, as the Trefine is more handy, and can be more easily pressed harder on one side or the other, according as it may be found necessary, it seems the more eligible of the two; and has accordingly prevailed with most of the *English* Surgeons, as the Trepan is mostly received by the *French, Germans*, and other Foreigners. But unless the Crown of the Trefine be made with its Teeth leaning, or ascending spirally one over the other, and inclined but little from the Cylinder towards the Cone, it will work very slowly. I therefore prefer the Trefine, whose Crown is a Frustum of a very long or extended Cone, which makes it cut sooner through the Bone, and yet so much more enlarges the Opening without than within, as to give free liberty for Inspection to the Eye. It may indeed be said in favour of the Trepan, that it works quicker, and that the Pressure being more equally distributed to the Teeth of the Crown, it cuts a more even Circle of an equal depth; but in this Operation one must proceed slowly and cautiously, and the Bone being often of an unequal thickness, requires to be cut more

on

on one side than on the other. In short, I should chuse the Trepan to perforate the outer Table, and the Trefine to finish the Operation, were it not for employing two Instruments for what may be done by one.

Q. 128. How do you apply the Trepan?

A. After the Bone is sufficiently exposed, and the Hæmorrhage suppressed, the Head being supported in a proper Posture, I first take the perforating Trepan (*fig. 6. Tab. E.*) and fix it in the Handle *b*, *fig. 1.* instead of the Crown *a*, to make a small Entrance; then fixing on the Crown *a* with its Spindle *e*, I proceed to turn it round slowly and lightly, till the Teeth have made a circular Entrance; then taking out the Spindle, I continue to work the Crown by itself pretty briskly till it has reached the Diploe, taking out the Instrument, and brushing off the Saw-dust now and then, both from its Teeth and from the Bones, by the Brush (*fig. 7. Tab. E.*) But considering that in some People, and in some Parts of the Skull, the Diploe is absent, I therefore proceed after a while more slowly, and with more Caution; frequently inspecting and searching the depth and equality of the Ring with a Tooth-pick,

When I judge the Bone to be cut a little more than half way through, I fix in the small Screw *b*, (*fig. 1. Tab. D.*) and giving it an Entrance by two or three turns in the Center, take it out, and proceed to work the Teeth of the Crown hardest upon that side of the bony Circle which appears thickest or whitest, pressing less upon that side which appears thin by its livid or blue Colour; and thus I proceed cautiously to avoid wounding the dura Mater, till the bony Segment is loose, and adheres to the rest by very few Fibres; at length removing the Trepan, I screw in the Terebra *b*, (*Fig. 1. Tab. D.*) and draw out the Piece before it is quite cut through. The Edges of the Bone next the dura Mater are now to be smooth'd by the lenticular, (*Fig. 14. Tab. E.*) the Splinters are removed from the dura Mater, together with the Blood, by applying some Lint, restraining the Hæmorrhage (if necessary) by moistening with *sp. vini*: and if, after all this, Blood or Matter appears confined under the dura Mater, an Incision is made through it by the Lancet, to give a Discharge, and to extract the Splinters, if any are lodged under it; but in doing this, I am cautious to avoid wounding any of the Arteries, Veins,

or

or Sinus's of the Meninges. If this does not suffice for the removal of the Splinters, Fragments or extravasated Humours, I repeat the Operation again, where it seems necessary, in the manner before described.

Q. 129. How do you dress after the Operation?

A. After the Fragments and extravasated Humours are removed, if the dura Mater is not perforated, I apply a round Pledget of dry Lint (*Fig. 9. Tab. E.*) with a Thread fastened to it, arming it with a little *mel rosarum* and *Fryer's Balsam* mixed together; then impose another Pledget of dry Lint, *Fig. 10.* over that another large one, *Fig. 11.* spread with some Digestive, upon the Integuments; then a Compress dipped in *sp. vini campb.* and secure the whole by a Plaster and the capeline Bandage (*Fig. 14. Tab. E.*) But if the dura Mater is laid open, and the Brain exposed, to prevent it from rising up into a Fungus, for want of the resisting dura Mater and Skull, I apply a Plate of Lead (*Fig. 12. Tab. E.*) perforated with small Holes, and bent like two Handles, as at *Fig. 13.* adapting it to the Aperture of the Skull, and placing over it some dry Lint to absorb the

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Humours,

Humours, which escape through the Perforations, compleating the rest of the Dressing as before.

Q. 130. What Cautions do you judge necessary in relation to Wounds of the Head?

A. (1.) That such Wounds ought not to be deemed slight, especially when attended with vomiting, and other bad Symptoms, which denote the Skull or Brain to be injured. (Q. 116. (4).)

(2.) That the Blood-vessels of the dura Mater and Brain may be injured by Concussion without a Fracture of the Skull, whence Death may follow, if the extravasated Blood is not removed by the Trepan.

(3.) If Blood or Matter appears lodged between the dura and pia Mater after trepanning the Skull, an Incision must be made through the former to discharge it.

(4.) That rancid, oily or fat Substances in any Form ought not to be applied to Wounds of the Head, since they are more or less a Caustic, and disposed to create or spread a Caries.

Q. 131. How is your capeline Bandage made.

A. With

A. With a Piece of Linen two fingers broad and six ells long, rolled up with two Heads, the middle of which being fixed upon the Occiput, the Rollers are crossed upon the Forehead, and one of them carried across over the Vertex and sagittal Suture, *Fig. 14. Tab. E.* and the other Head is carried in a Circle *b, c,* till it has crossed the other; and thus the two Heads of the Roller are continued, one crossing over the Scalp, and the other continued round it, in the Course *c d, e f, g b, &c.* till it is covered, terminating the Bandage at last, by bringing one end over the sagittal Suture *a,* and pinning the other end in the Circle *b c.*

Q. 132. How do you distinguish and treat Wounds of the Neck?

A. These according to the Nature of the Parts wounded are more or less dangerous. Such as penetrate into the carotid Artery, or internal jugular Vein, soon kill the Patient by a fatal Hemorrhage, unless a Surgeon is at hand to open the Integuments, and tie up the Vessel; and in that case the Patient may be saved, though the Course of the Blood on that side the Head be intercepted, as we learn by Experiments on a Dog. If the Wind-

Windpipe only is wounded with the external Jugulars, the Case is not so dangerous as might be imagined, provided it is not quite cut in two, so as to let the lower Part contract into the Thorax. Here the divided Parts are to be brought together by Suture with a Needle and thread, or by introducing two Needles, one in the upper, and the other in the lower part of the Trachea, (so however as to avoid injuring the internal and very sensible Membrane) afterwards binding them together with a thread after the manner of the Hare-Lip, *Tab. C. fig. 9.* and when the Trachea is united, the Wound then may be healed after the common Method (*Q. 89, & seq.*) — Such Wounds of the Neck as penetrate the Gula, are very dangerous, and rarely cured, because of its Action in Deglutition, in which the Aliments escape and corrupt about the wounded Part; and are commonly attended with a troublesome Hiccup or Vomiting. Such Wounds of the Neck as divide the Par vagum and other large Nerves, which supply the Viscera of the Thorax and Abdomen, are always fatal in time (though not immediately) by inducing a Palsy of those Organs.

Q. 133. How do you discover a Wound penetrating the Cavity of the Thorax?

A. By the Probe; by holding a Wax-Candle against the Wound, and observing if any Air enters or returns, while the Patient lies in the Posture wherein he received the Wound; by injecting some Liquor which is refused a Passage, and from the Signs of the Lungs adhering to the Pleura of the Part wounded: but even the Matter formed in a Wound which does not penetrate, may by degrees make its way through the Pleura, so as to produce an Empyema with all its Consequences; and therefore Care should be taken to procure a free Exit to the Matter in these Wounds, by making no Pressure or Obstruction at their Orifice.

Q. 134. What Effects follow from a Wound penetrating the Thorax?

A. They are an Obstruction of the Breathing, and the Circulation of the Blood through the Lungs; an Extravasation and Spitting of Blood; an Empyema purulent, hectic, &c.

Q. 135. How do you know Blood is extravasated in the Thorax by a Wound penetrating its Cavity?

A. From

A. From the Oppression or Difficulty of breathing; from the Patient lying easy only upon his Back, not being able to lie on the sound side, nor without great uneasiness upon the wounded; by the present Effects of a Wound thus penetrating, as last mentioned (Q. 134.); and finally, from the Fluctuation, an Oppression upon the Diaphragm, attended with great Weakness, Paleness, and cold Sweats.

Q. 136. How is an Emphysema sometimes produced in these Wounds?

A. This is a flatulent Distension of the cellular Membrane, by the Air forcing its way through the Lips of the Wound into the Cells, after it has been confined and rarified in the Cavity of the Thorax, into which it is often poured thro' the wounded Lungs; for when once the Air has thus made its way into the cellular Membrane, it soon spreads throughout the whole Body, and causes a soft pellucid Tumor immediately under the Skin, except at the Soles of the Feet and Palms of the Hands, causing a Tumor in some places near a foot thick; as in the History mentioned in *Mem. Acad. ann. 1713. p. 15, 18, 119, & seq.* To prevent this therefore, the cellular Membrane must be compressed.

compressed at the Wound, and the Flatus which has once enter'd it must be discharged, by Compressure, through an Incision of the Integuments.

Q. 137. How do you treat a Wound penetrating the Thorax?

A. The first Intention is to discharge the extravasated Blood as soon as possible, by placing the Patient in a convenient Posture; by diluting it with some deterging Liquor injected, and then extracting both by the Syringe, *Fig. 1. Tab. F.*; lastly, by dilating the Wound, or making a new Opening betwixt the second and third of the lower false Ribs, at about a hand's breadth from the Spine, and as much from the lower Angle of the Scapula, directing the Incision in a parallel Course betwixt the Ribs, with the back of the knife upward, and the edge inclined downward, the point being obtuse, as in *Fig. 2. Tab. B.* to avoid injuring the Lungs, and to avoid wounding the intercostal Vessels, which run along the lower side of each Rib. While this is performing, at first the Patient should incline backwards, that the Skin and latissimus dorsi Muscle may be more easily taken up and incised; then leaning forward, the
Incision

Incision may be made through the tense intercostal Muscles and Pleura in the Center betwixt the two Ribs. If the Lungs should adhere to the Pleura in that part, one must be very cautious not to wound them, but to carefully and gently separate them by the finger: but if the whole side of the Lungs should adhere to the Pleura, so that they cannot be separated; this indeed must render the Operation useless, but cannot give occasion of any just Reflection upon the Surgeon.

Q. 138. How do you discharge the Air which has entered into the Cavity of the Thorax?

A. By ordering the Patient to fetch as deep an Inspiration as possible, and then by closing the Lips of the Wound together immediately after the Air is expelled by the Expansion of the Lungs: but it will be in vain to attempt this exact Exclusion of the Air, until the Thorax is perfectly freed from the extravasated Humours; and when once it is performed, great care must be taken to prevent the Air from entering again.

Q. 139. How do you treat these Wounds when they penetrate the Lungs?

A. If

A. If any of the large pulmonary Blood-vessels are divided, a fatal Hæmorrhage presently ensues; or if their cellular Substance only is wounded, an Hæmoptoe ensues more or less, and the Wound heals more slowly than it otherwise might, on account of the incessant Motion of this Organ. In this Case therefore the Patient is to be reduced as low as possible, by bleeding when necessary, using a liquid, spare and cooling Diet, and abstaining from every thing which stimulates or increases the Blood's Motion; and especially if a Cough attends, that must be allayed by lenient Purges, Balsamics, and Opiates when necessary.

Q. 140. How do you discover that a Wound penetrates into the Abdomen?

A. By the same Methods as in a Wound which penetrates the Thorax before-mentioned (Q. 133.)

Q. 141. What are the Consequences of a Wound here, which penetrates no deeper than the Peritonæum?

A. Unless proper Care be taken, the Intestines, Omentum, and other Viscera being urged downward by the Diaphragm at every

every Inspiration, will distend the Peritonæum into a Sacculus, and thrust out the Intestines where the Integuments give the least Resistance, so as to form an Hernia; which may be of the most fatal Consequence, when the Wound runs obliquely betwixt the Muscles, or is not timely discovered and relieved.

Q. 142. How do you discover that the abdominal Viscera are wounded?

A. If warm Water injected returns colourless, and if the Patient is not afflicted with any violent Symptoms, I conclude they are safe; but if a violent Fever, Vomiting, Hiccup, &c. appear, while the Injection returns discoloured, there is reason to suspect some of them injured: but which of them it is, I conclude from the Make and Extent of the wounding Instrument, the Course of the Wound, and its Situation with respect to the Regions of the Abdomen and their several contained Parts; as also from the Matter which is discharged from the Wound: if the Chyle or Aliments are discharged in their crude State, I conclude that the Stomach or small Intestines are wounded; if the Fæces are discharged, the large Intestines; if a
great

great quantity of serous and bilious Liquor is extravasated, the Direction of the Wound being towards the Liver, while the Intestines lose their peristaltic Motion, and are not obedient either to Purges or Clysters, the Patient being restless and without Fever, I conclude the Gall-bladder or Duodenum to be wounded, which is a Case of the greatest Danger; if the Urine is made bloody, the Kidneys are probably injured; but if the Urine is discharged through the Wound, either the Bladder or Ureters are wounded; if the most acute Pain, Fever and Inflammation attend, and rise upward towards the Throat, without a Discharge of the fore-mentioned Humours, the Mesentery is probably wounded, which is commonly fatal: so that from considering the Nature of the Wound, the Instrument, and the several Viscera of the Abdomen, with their injured Functions, one may nearly estimate the Danger and Consequences of Wounds penetrating the Abdomen, and injuring its Contents.

Q. 143. How do you treat a Wound penetrating the Abdomen, without injuring the Viscera?

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A. If

A. If the Wound be very large, the Intestines and Omentum appearing sound, I return them with all convenient speed, then unite the Peritonæum and Integuments together by the interrupted Suture (*Tab. C. fig. 4.*); which is likewise necessary in large transverse Wounds of the Abdomen, even if they do not penetrate the Peritonæum. But first, if the Intestines are wounded, I unite them loosely with the Glover's Suture; and if any Part of the Omentum appears gangrenous, livid, and cold, I amputate it: but if the Intestines, being sound, are so distended with Flatus, that they cannot be returned, either the Wound must be enlarged, or a small Puncture made through the Intestine by a tubulated Needle to let out the Flatus. The thread with which the Intestine was sewed, or the Omentum tied before its Amputation, must be left out of the Abdomen, in order to bring those Parts to view at the Mouth of the Wound, and to extract the threads when necessary; or that if the Intestine should mortify, the Extremity of it may be brought to the Mouth of the Wound, and there agglutinated to form an artificial Anus, of which we have numerous Instances. But in small longitudinal Wounds of the Abdomen, especially in
fat

fat People, the Suture must be omitted, and the Parts united by Bandage and Compress, with sticking Plasters; always observing to keep a small Opening for the Discharge of Humours that may be contained in the Abdomen, by filling the Aperture with dry Lint secured by a thread. But as the Suture of the Intestines is commonly attended with Inflammation and fatal Consequences, therefore some of greatest Note chuse only to pass a waxed thread round the divided Extremities, so as to bring them to the Mouth of the Wound, and there procure them to unite, either together, or to the Peritonæum itself; though there are several Instances where the Suture has succeeded, not only in Wounds of the Intestines, but also in the Stomach; but Care must be taken to repeat the stitches as seldom as possible, and not to draw the threads too tight.

Q. 144. How do you treat the Patient when there is a considerable Part of the Intestine lost, either by Incision or Mortification?

A. Though such a Case might at first View appear desperate, yet as we have numerous Instances of the upper Part of the

Intestine growing naturally to the Lips of the Wound, and forming a new kind of Anus; therefore the Margin of the Intestine is to be stitched to the Lips of the Wound, where uniting, it will become muscular and strong after some time, so that the Patient may survive only with the Inconveniency of wearing constantly a tin or silver Receptacle for the Fæces, which will be continually discharging, but are not near so offensive as those which come naturally from the larger Intestines. The same Method must be taken when the Intestine is mortified, after having amputated the dead Part.

Q. 145. How do you treat the Patient with respect to Medicines and Diet in these Wounds?

A. As here nothing is more to be feared than an Inflammation of the Viscera, which after the most excruciating Pains may turn to a Gangrene, and destroy the Patient; therefore bleeding must be frequently repeated at discretion, while cooling Medicines are used internally, and the Patient kept upon a healing liquid Diet, which affords no Fæces to load the Bowels; such as small Flesh-broths a little acidulated with *Seville Orange* or *Limon*

mon Juice; Broths of Eels or Cray-fish, clarified Whey, Jellies, Juice of boiled Turneps, &c. In the mean time the Patient must be kept at rest in a convenient Posture, with his Head and Breast raised considerably high, not neglecting the frequent use of emollient Clysters, when the Wound does not penetrate into the large Intestines, which surrounding the small ones and the adjacent Viscera, will communicate the Warmth and dis-cutient Efficacy of the Clyster, almost as well as if it was a Fomentation immediately applied to the Parts themselves; but if the large Intestines are wounded, it is evident that the only Stress must be laid upon Laxatives, with cooling and diluent Medicines administered by the Mouth, since Clysters would be extravasated by the Wound into the Cavity of the Abdomen.

Q. 146. How do you treat the Patient, when the other abdominal Viscera are wounded?

A. In the manner before-mentioned (Q. 145.), only with the addition of healing Injections into the Cavity of the Abdomen itself, taking a particular Care to prevent any of the animal Humours from stagnating and

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corrupting in that Cavity, and excluding the access of the external Air as much as possible, as it is a principal Cause in corrupting or putrifying the Juices.

Q. 147. How do you dress after Wounds in the *Thorax*?

A. After the application of Lint, either dry or spread with some Balsam, with Emplaster and Compress, I apply the Napkin and scapulary Bandage used in the Paracentesis, and most other Disorders of the Thorax. It is made with two pieces of Linen, the one an ell or more in length, according to the Bulk of the Patient, and a yard wide, which is like a Napkin, to be folded four or six times together, and then closely applied round the Body over the Dressings, where the two Extremities are to be fastened either by Pin or Suture, as in *Tab. S. fig. 1.* but to prevent this Napkin from subsiding, it is to be fastened to the two ends of the Scapulary before and behind; which last is a slip of Linen, about a yard long, and about a hand's breadth, slit in the middle to transmit the Head and Neck; or else, which is the more commodious way, it may be slit up at each end almost to the middle, which being applied

plied to the back part of the Neck, two of the ends are brought over the shoulders, crossed upon the Sternum, and then fastened laterally to the Napkin on each side *a, d*; and in the same manner are the other ends to be crossed and fastened behind the Back.

Q. 148. How do you dress after Wounds in the *Abdomen*?

A. After slight or small Wounds, the Napkin and Scapulary before described (Q. 147. *Tab. S. fig. 1. B C.*) will be sufficient to retain the Dressings: but here I first apply the uniting Bandage (*Tab. II. fig. 30.*) or else a double-headed Roller after the dry Suture, in order to retain the wounded Lips together; avoiding the true Suture as much as possible, except when the danger of a Hernia, or the transverse Course of the Wound makes it absolutely necessary.

Q. 149. How many Kinds of *Fractures* do you make?

A. They may be distinguished into three Species, according as they are attended more or less with other Symptoms; namely, into simple, compound, and complicated. *Simple Fractures* are those, where the Bones are

divided only in one Part, without injuring the adjacent soft Parts, as commonly happens when the Radius or Fibula only is fractured, the Ulna or Tibia sustaining the soft Parts and the fractured Bone in the mean time. But a *compound Fracture* is when a Bone is broke into several Fragments without any violent Symptoms; but if attended also with a Wound, Contusion, Inflammation, Hæmorrhage, &c. it is then termed a *complicated Fracture*; namely, when these Symptoms require a Treatment distinct from that of the Fracture itself.

Q. 150. What are the Signs and Effects of a *compound* or *complicated* Fracture?

A. They are chiefly a Collapsion and Deformity of the Parts, with a Contraction and Distortion of the Muscles for want of their bony Support; a Laceration of the Periosteum and adjacent Vessels, Membranes, Nerves or Tendons; whence Inflammation, Convulsion, Ecchymosis, Suppuration, Gangrene, &c. may follow, according to the degree of Complication and Injury, with the Nature or Fabric of the Part.

Q. 151. What are your curative Intentions in a Fracture?

A. They

A. They are, (1.) To replace the Fragments by Extension and Reduction, so as to restore the Bone to its natural Situation: (2.) To retain them in that Posture by Compress, Bandage, and suitable Instruments: (3.) To forward the Consolidation by a growing Callus, and to treat the concomitant Symptoms, as may be found necessary. The first of these Intentions I compleat by placing the Part in its natural Posture, and making a slow Distraction of the Fragments from each other in a right Line, till the contractile force of the Muscles is overcome; and this I do either by the Hands, Slings or Machines, while the Patient is held firm.

Q. 152. Do you directly execute these Intentions in every compound Fracture?

A. If it is attended with any violent Inflammation or Tumor, it is advisable here, as well as in a Luxation, previously to palliate and lessen the Symptoms before the Reduction is attempted: if any protuberant Splinters or loose Fragments seem to hinder the Extension and Reduction, they ought to be first removed by Incision, if they cannot without; but if the Bone is much shattered, so as to destroy the larger Vessels, &c. an immediate

mediate Amputation should be made to prevent worse Consequences, if nothing forbids.

Q. 153. How do you know when the Fragments are properly reduced?

A. From a previous Acquaintance with the anatomical Structure of the Parts, from the Removal of the Pain, and from comparing the Figure and Length of the injured with the sound Limb.

Q. 154. How do you retain the Fragments in their natural Position?

A. By the application of suitable Bandages, Bolsters and Splints, with other Machines, keeping the Limb at rest, and duly sustaining or directing the Actions of the Muscles, varying the Apparatus according to the particular Nature of the Fracture.

Q. 155. What Time is required to firmly consolidate the Bones by a *Callus*?

A. This will take up from one to two months, more or less, as the Patient is younger or older, of a good or bad habit, the Bone larger or smaller, and the more or less incumbent Weight it must sustain.

Q. 156.

Q. 156. What practical Cautions do you judge most necessary to be observed, with respect to Fractures in general?

A. 1. To avoid disturbing the Bones by extending or moving them, if they shall be at first found in their natural Situations; Retention and Deligation alone being in that Case sufficient.

2. To cautiously avoid too strict a Bandage, which may produce a Tumor, Gangrene, and the worst Consequences; and yet to order them so as to sit moderately firm, considering that after their first application they will stretch and loosen a little.

3. If the Fracture be attended with great Pain, Inflammation and Tumor, not arising from Splinters; in that Case the Patient must be bled, and the Parts treated with antiseptic Fomentations: but if these Symptoms arise only from the Irritation of the bony Fragments, it is best either to remove or replace them immediately with a due Extension, proportioned to the Age of the Patient and Strength of the Limb.

4. To be particularly careful to make a slack Deligation, when there are loose Fragments; and to relax the Bandage, if the Inflammation increases; and if that with bleed-
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ing the Patient, a Removal of the Splinters, &c. prove ineffectual, a Gangrene and Sphacelus being threatened, the Part ought to be timely amputated.

5. To avoid the application of Ointments, Oils, or sticking Plasters to the Skin, when there is any degree of Contusion; lest these cause a Suppuration by obstructing the Pores and heating the Part, which ought rather to be treated with discutient Fomentations.

6. To observe that if a Fragment is large, still adheres to the Periosteum, and is capable of being reduced without much Injury to the soft Parts, it ought not to be extracted or cut off, and the reverse.

7. To observe that the Limb be carefully and gently moved in its Articulations every day, to disperse the Synovia, and prevent a Stiffness of the Joints; and this more especially if the Fracture, being seated near the Articulation, gives the Callus an opportunity to shoot up and form an Anchylosis, by cementing the Heads of the Bones, or stopping up the Cavity of the Joint.

8. To avoid the common Custom of applying Bole or other sticking Plasters immediately to the Skin, not only in Fractures but in Luxations, when it is much better to apply

ply a Compress dipped in *oxycrate*, *sp. vini*, *camph.* &c. because the former are not only troublesome to remove, but likewise obstruct the Perspiration, and often inflame the Part, at the same time that they afford little or no use as a Retentive.

9. That if the Bones in a simple Fracture should by any Accident be united in an improper Posture by the Callus, so as to endanger a Deformity or Lameness; if the Callus be recent, or not too much indurated, and the Patient strong and of a good Habit, it may be proper to separate the Bones again, and reduce them to their just Positions by breaking the Callus; but this not without the Advice and Assistance of one well experienced.

10. To observe that in young and warm Habits, the Circulation ought to be moderated at discretion, by Bleeding, spare and low Diet, &c. in order to prevent a Luxuriancy of the Callus: and that to forward the Formation of it in old and weak Habits, the Patient's Strength must be kept up with Cordials, and plenty of good Nourishment.

Q. 157. What is a *Luxation* or Dislocation?

A. This

A. This is distinguished into *perfect*, and *imperfect*; the latter call'd a *Subluxation*; the first is, when the moveable Head of any Bone is displaced from its Articulation, so as to impede and destroy the Motion and Office of the Part; but the latter is, when the Ligaments only are strained, the Bone either slipping again into its place, or remaining but a little distorted. The *perfect* Luxations happen chiefly in Bones articulated by *Diarthrosis*, having a manifest and ample Motion, as in those of the upper and lower Extremities; but the *Subluxation* is more peculiar to the *Synarthrosis*, where there is little or no Motion, as in the Bones of the Carpus, Tarsus, &c.

Q. 158. How do you discover a *perfect* Luxation?

A. (1.) From an Immobility and Disfiguration of the Limb, which appears distorted, and longer or shorter than it ought to be. (2.) From an Excavation upon the Joint, and a Tumor where the Head of the Bone is thrust, the lower Head of the Bone appearing distorted in an opposite direction to the upper Head. (3.) By feeling with the fingers, and enquiring into the Patient's Account

count of the Accident, with the Severity of the Symptoms, and a Knowledge of the Articulation.

Q. 159. What are the principal *Causes* of Luxations?

A. These may be either external or internal, or both concurring together. Under the former are included Falls, Blows, Strainings, &c. the internal are a Laxity and Weakness of the Ligaments, and a Tumor of the mucilaginous Glands, or a Congestion of Humours in the Cavity of the Joint; but when the Dislocation proceeds from these last Causes alone, the Joint is usually free from Pain, Inflammation or Tumor, and the Head of the Bone may easily be slipped into and out of its Cavity.

Q. 160. What are your curative Intentions for a Luxation in general?

A. They are (1.) to extend the Limb, so that the Head of the Bone may be free from Obstacles on any side; (2.) by reducing the Head of the Bone into its proper Situation, which follows almost spontaneously, usually with a noise when the Limb is duly extended in a proper direction, especially if there is
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the least assistance given to it by the hands; (3.) to retain the Bone by suitable Deligation, till the Ligaments have recovered their due Tone, keeping the Limb and Body in a just Posture. But these Means are to be varied according to the particular Nature of the Joint luxated. — For Cautions here consult those mention'd before for Fractures (2156.)

2161. How do you discover and cure a Luxation of the Head?

A. A Dislocation of the Head in its Articulation with the *Atlas* or uppermost Vertebra, readily discovers itself by the Distortion of the Chin thence following, either forward, or to one side; but this, as it compresses the Medulla oblongata passing from the Brain and Cerebellum, is constantly attended with sudden Death, unless some Person in the very Instant lifts the Patient up by the Head from the ground, or otherwise makes a Reduction by extending the Neck. Thus the chondyloide Processes of the Occiput may easily slip out of their glenoide Cavities in the first Vertebra of the Neck, by a Fall from a Horse, or from any high Place, in which Case the Chin is usually distorted close down to the Breast, and as this Luxation without immediate

diate Assistance brings sudden Death, it is commonly called a breaking of the Neck, but more properly a Dislocation of it.

Q. 162. How do you treat Luxations of the Spina dorſi?

A. The Vertebrae of the Spine are fo strongly articulated together by robuſt Ligaments and Cartilages, with oblique aſcending and deſcending Proceſſes locking one into another, that they cannot well be diſlocated without a Fracture of the Proceſſes; in conſequence of which the ſpinal Medulla being wounded or compreſſed, a Palyſy of all the Parts below the Injury muſt follow, the Urine and Fæces come away involuntarily, and a Diſtortion appears in the Spine either backward or to one ſide, where the Luxation is made. The Caſe is more fatal, as the Injury is nearer the Head; and though moſt Patients miſcarry rather from the Injury of the contained Medulla, than the difficulty of reducing the Bones (which is not ſmall); yet trial ought to be made whether any Relief can be afforded by Art. The Spine is therefore to be extended by inclining the Patient over a Caſk, or other cylindric Body, which naturally reſtores the Vertebrae to their

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proper

proper Situations, provided, if the Disorder is lateral, that the Patient is inclined in this Posture towards the other side; and then the fractured or dislocated Proceffes may be restored by the Fingers, After applying a Compress dipped in *sp. vin. camph.* retained by the Napkin and scapulary Bandage (Q. 147.) the Patient is to be bled, treated with proper Medicines, and retained in a convenient Posture in his Bed.

Q. 163. How do you treat a Luxation of the *nasal Bones*?

A. These may indeed be beat flat, by a Blow or some other Violence, in Children, but hardly without a Fracture in Adults; and in either Case they are to be raised again by a Goose-quill, or some other such cylindric Instrument, replacing them in the mean time by the Fingers applied externally, and completing the Dressing with a bit of sticking Plaster, retained by the nasal Sling, *Fig. 7. Tab. S.* applied with its Aperture *a* transmitting the Apex of the Nose; I then carry its two upper Heads *b b*, obliquely downward behind the Occiput, where being crossed they are then tied upon the Forehead *c c*, by the knot *d*; then the lower Heads *e e* are carried obliquely

obliquely upward over the Cheeks and Temples *f*, crossed upon the Occiput, and tied on the Forehead *g g*. Some indeed introduce a Pewter Canula into each Nostril, and apply Splints externally, which is seldom necessary.

Q. 164. How do you treat a Dislocation of the Jaw?

A. Notwithstanding the firm and artful Articulation of this Bone, it has sometimes either one or both of its round Heads thrust out of the glenoid Cavities of the Os petrosum, into which they are articulated, and this either by yawning, or some other Violence. If both Heads are luxated, the Mouth gapes wide open, the Chin is thrust down to the Breast, and the Patient can hardly speak or swallow at all; but if only one Head is dislocated, the Chin inclines towards the opposite side. In either Case, the Patient being seated on the Floor, and held by an Assistant, I introduce my two Thumbs wrapped in a clean Napkin, as far as possible, into the Patient's Mouth, while my Fingers come under the sides of the Jaw, which I thus press downward and backward; but mostly towards the injured side, when only one head of the Jaw is displaced, which is rarely the

Case. Then applying a Compress dipped in Vinegar, *sp. vin. camph.* I then use the Bridle or Sling with four Heads, (*Fig. 7. Tab. S.*) about an ell long, and five or six fingers breadth, and applying the Aperture to the Chin, the two upper Heads are crossed upon the Occiput, and then tied upon the Forehead *cc* by the knot *d*, while the two lower Heads are carried up by the Cheeks *f*, and tied upon the Vertex *g*, or else carried down again and tied under the Chin.

Q 165. How do you treat a Fracture of the lower Jaw?

A. I first apply my Forefinger of one Hand within the Jaw, and endeavour to replace the Fragments by those of the other Hand without; and if any of the Teeth are struck out, I replace them immediately, since they have been often observed to grow again: if there should be any loose fragments incapable of Reduction, I extract them as soon as possible, either by Incision, or as soon as a Suppuration will allow; and compleat my Dressing for the first time with a Compress dipped in *sp. vini vel acet.* applied internally, while externally I adapt another Compress, moistened as before, and fastened to a piece of

of strong Pastboard cut in the shape of a half Jaw; and this I repeat on the other side if necessary, and retain them by the Bridle before-mentioned in a Luxation (*Tab. 8. fig. 7.*), observing to bleed and treat the Patient with a proper Regimen and Medicines, according to the Circumstances of the Case.

Q. 166. How do you discover and treat a Luxation and a Fracture of the *Clavicle*?

A. This Bone hardly admits of a perfect Dislocation, without breaking the Ligaments which connect it at each end to the Sternum, and to the Processus Acromion Scapulæ; in either of which Places the dislocated Head may be felt, the Patient not being able to lift up the Arm to his Head. But the Clavicle is much more liable to a Fracture, from its Weakness and transverse Position; which when it happens may be easily discovered by the Fingers, as this Bone lies immediately under the Skin. After the Fragments are reduced, as in a Luxation of it, by ordering a strong Man to pull back the Patient's Shoulders towards each other, against a narrow-backed Chair, or some other Support, while the Fingers conduct them properly before; and if the Fracture is not oblique, the two

Ends of the Bone will sustain each other, if they are guarded with a Compress of Emplaster rolled up with two Heads, as in *Tab. II. fig. 2. O O P P* and applied on each side above and below the Bone. Over this is to be applied a Compress and piece of Pasteboard; then another Compress to be retained by the Capeline Bandage, *Fig. 8. Tab. S.* or by the simple Spica, *Fig. 2. Tab. T.* when the Fracture is next the Shoulder; which is to be kept extended by a Roller pass'd several times round the two Shoulders, and crossing upon the Back like a figure of 8.

Q. 167. How do you treat a Fracture of the *Scapula*?

A. This Bone is seldom broke but in its Acromion or Process which meets the Clavicle; in which Case the strong Contraction of the deltoide Muscle makes it difficult to retain the Fragments so together, as to prevent the Callus from shooting out longer than it ought; whence the free Motion of the Arm upwards will be impeded after such a Fracture: but in the mean time this must be remedied as much as possible, by keeping the Arm raised with a Ball fixed in the Axilla, a Compress above, and the whole retained by the

the spica Bandage, *Tab. T. fig. 2.* A Fracture in the Neck of the Scapula (which seldom happens) is extremely difficult to reduce, and often attended with the worst Consequences, from the Vicinity of the large Nerves, Blood-vessels, Ligaments, &c.

Q. 168. How do you treat a Fracture or Depression of the Sternum?

A. To raise or reduce the Fragments to their proper Situations, I lay the Patient with his Back leaning over a small Cask, or some other cylindric Body, and at the same time press the two sides of the Thorax together with my Hands, while an Assistant thrusts down his Shoulders; and if this does not suffice, I make an Incision through the Integuments, and endeavour to raise up the Part by a Screw, as in a Depression of the Skull; and if any considerable quantity of Blood should be extravasated betwixt the Duplication of the Mediastinum, or into the Cavity of the Thorax, it must be discharged in the first Case by trepanning the Sternum, and in the last by the Paracentesis, as before, to prevent an Empyema.

Q. 169. How do you treat a Luxation and Fracture of the Ribs?

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A. Their

A. Their Heads next the Spine may be displaced either upward, downward, or inward; the two first are more easily reduced, by raising up the Patient's Arm over a Door, Board, or the like, endeavouring to replace the Bone by the Fingers, while the Ribs are thus drawn asunder: but the last is more difficultly reduced, by ordering the Patient to take a deep Inspiration, while he is inclined forward over some cylindric Body; and if this with the Assistance of the Fingers will not suffice, the Bone may be left dislocated, provided there are no violent Symptoms; otherwise an Incision must be made, to replace it by a Hook, or with the Fingers.—A simple Fracture of the Ribs is not dangerous; but when their Extremities start either thro' the Pleura inward, or the common Integuments outward, the danger is considerable; especially in the former, as the Consequence may be a violent Fever, Pains, Extravasation, Empyema, &c. If the Extremity of the fractured Rib projects outward, the Patient must be placed as above for a Luxation, and the Fragments gently pressed into their Places by the Fingers; but when they point inward, the Patient must fetch a deep Inspiration, and then the sides of the Thorax must be shook
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and pressed together by the Hands next the Sternum. After the Reduction of the first, Pasteboard Splints are secured upon the Fragments, to prevent their rising outward; but in the latter there is no occasion for them, only thick Compresses are to be secured along the Ends of the Ribs next the Sternum, and the Dressings retained by the Napkin and Scapulary before-mentioned (Q. 147.)

Q. 170. How do you treat a compound Fracture of the *Ribs*, with a Wound of the intercostal Arteries, Muscles, &c.?

A. In the first place I endeavour to suppress the Hæmorrhage as soon as possible, by tying a piece of Linen rolled up into a Cylinder in the middle of a strong waxed thread, one end of which being passed round the Rib by a Needle, I draw the Compress over the Sulcus in the lower edge of the Rib; and then by tying the thread hard round the Bone, by that means compress the intercostal Artery and Vein: and if any Splinters or irritating Fragments appear wounding the Pleura or adjacent Muscles, I either replace them, or else extract them with or without Incision, as shall be found most convenient.

Q. 171. How do you treat Luxations and Fractures of the *Vertebrae*?

A. These cannot be displaced without a Fracture of their interfering Processes; and without the utmost hazard of the Patient's Life; because the *Medulla Spinalis* being compressed or wounded, will produce a Palsy of the Parts below; whence it is evident, that these Luxations are no less dangerous than difficult to reduce: in order to which the Patient is to be laid, when the vertebral Processes are displaced, on both Sides, inclined over a Cask or other cylindric Body; but inclining more to the sound Side, if they are displaced only on one Side, while in the mean time an Attempt is made by the Fingers to replace them; which done, a Compress is applied, dipped in some antiphlogistic Liquor, and then a Pasteboard Splint retained by the Napkin and Scapulary. But if any loose Splinters injure the spinal *Medulla* and adjacent Parts, they must be removed by Incision, if they cannot be replaced.

Q. 172. How do you treat a Fracture and Dislocation of the *Os sacrum* and *Coccyx*?

A. If the *Os sacrum* should appear to the Touch fractured by some Fall, Blow, or other

other Violence, the Fragments are to be replaced by the Fingers applied externally, when they point outward; or if they point inward, by introducing the Finger into the Anus; and after the Reduction, Compresses are to be retained upon the Part by the T Bandage, and the Patient is to lie on one side or the other alternately; or if he sits, it must be in a Chair with a hole in the bottom, to prevent any displacing of the Fragments by Pressure. A Fracture or Dislocation of the Os cocygis is to be treated in the same manner.

Q. 173. How do you treat a Dislocation of the Femur?

A. The round Head of this Bone is so strongly articulated into the deep Acetabulum by the round and capsular Ligaments, secured by very thick incumbent Muscles, that it is almost impossible for it to be dislocated by any Force, without a previous Relaxation, or a Tumor of the mucilaginous Gland lodged in the Cavity; from whence, and from the Friability of the Neck of the Femur, as also from innumerable Dissections of Bodies thus affected, it is evident that the Femur happens to be fractured in its Neck nineteen times

times to one Dislocation; so that what is commonly taken for a Dislocation of the Femur, is in reality a Fracture of its oblique Neck. Yet it must not be denied, that in weak, cachectic and scorbutic People, and in Infants or Children, the Femur may by some Violence be dislocated, and that most commonly downward, and inward or forward towards the Opening in the Os pubis; in which Case the Knee and Foot straddle outward and backward, the diseased appearing longer than the sound Leg; the Head of the Bone is also perceptible below the Inguen; where by compressing the Nerves of the Bladder, it sometimes causes a Suppression of Urine, and a withering of the whole Limb from the same Pressure on the crural Nerve, if the Bone is not speedily reduced; as must be attempted by making a moderate Extension, either by the Polyspaston, *Fig. 4. Tab. I.* or by the Axis in Peritrochio, *Fig. 3. Tab. K.* while the Patient's Body is properly secured; and then by turning the Knee and Thigh inward, the Head of the Femur is to be directed by the Hand into the Acetabulum.—But it may be also displaced upward and backward, when the Limb will be shorter, the Foot will turn inward, the

the Heel will be raised from off the Ground; and the Limb will be more capable of Flexion than Extension. It is observable, that a Dislocation or a Fracture of this kind is commonly attended with a wasting of the Limb, from the more or less Injury offered to the crural Nerve.

Q. 174. How do you distinguish a Fracture from a Luxation of the Femur?

A. The Knowledge of this is no less difficult than the Cure, as the Joint is covered with such strong and thick Muscles, which resist an Extension and Reduction; and the latter especially is opposed by the Synovia, inspissated in a great quantity, if the Bone has been out any time: however, if I find the Limb may be turned about without any grating of the Bones at the Joint; and if the Symptoms of Pain, Inflammation, Tumor, &c. are slight or nothing considerable, I conclude there is no Fracture; which is indeed difficult enough to discover in fat People, but is more difficult to cure without a Halting or Shortness of the Limb; partly because the Fragments cannot be easily replaced by the Fingers, as they are covered with such thick Muscles; partly from the difficulty of retain-

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ing them from being displaced by the strong contracting Muscles; and partly from the oblique Direction of the Neck of the Femur. If then the Neck of the Femur appears to be fractured from the grating of the Bones, the Acuteness of the Pain felt above the Articulation upon setting the Foot to the ground, and the Shortness of the Limb, a violent Extension must here be carefully avoided, that the Fragments of the Bone may not be distracted from each other to the great Injury of the soft Parts; only such an Extension must be made, as will suffice to bring the Fragments even with each other, and to make both Limbs appear of an equal Length. The Fragments are to be retained together by a strict Bandage, the *Spica inguinalis*, (*Tab. T. fig. 3.*); and then the Limb may be kept extended at its due Length by the Axis in Peritrochio, (*Fig. 3. Tab. K.*) while the Patient's Body is retained firm by Napkins fastened to the Head of the Bed.

Q. 175. How do you treat Fractures in the Body of the Femur?

A. A simple transverse Fracture is the most easy to cure, as the Bones then sustain each other, and resist the Contraction of the Muscles;

Muscles; but an oblique Fracture is hardly curable without some Inequality of the Callus, or shortening of the Bone, unless the Limb is kept extended by the Apparatus described *Tab. K. fig. 3.* So soon therefore as the Fragments are replaced, I apply Compresses dipped in Vinegar, and make them press upon the Part by the spiral inverted Bandage applied moderately light; then I apply three Splints of slit Deal glued upon Leather; and lastly, a large Splint extending from the Hip to the Ankle to keep the Limb strait. But in a compound Fracture, where there are loose Fragments, and a Wound externally, the Case is very dangerous, from the Injury offered to the adjacent Nerves and Blood-vessels; whence violent Inflammation, Suppuration, Fever, Convulsions, &c. and as the Wound will require frequent Inspection, and a particular Treatment, with Cataplasms, Fomentations, &c. it will be here necessary to apply the foliated Bandage with eighteen Leaves, *Tab. K. fig. 1.* as in a compound Fracture of the Leg. If any considerable Ecchymosis appears, Incisions are to be made, that the Blood may discharge itself; then fomenting the Parts with an Infusion of *Theriac. in sp. vin. camph. cum oq. cal. cis p. e.*

Q. 176. How do you treat a Luxation and Fracture of the *Patella*?

A. The *Patella* seldom suffers a perfect Luxation, unless the Knee is dislocated at the same time, or unless the strong Ligaments are broke, which would otherwise restore it again to its proper place. When it is displaced, it must be on the out or inside of the Joint, since it cannot be thrust up above without a Rupture of its connecting ligamentary Aponeurosis at the *Tibia*, which is a Case frequently mistaken for a Fracture of the *Patella*, when in reality the whole Bone is contracted upward by the Muscles of the Thigh, while a Portion of its tendinous Ligament remains below adhering to the *Tibia*, and feels like a transverse Fragment of the Bone, as Mr. *Deverell* observes, *Phil. Trans.* N^o 365. p. 44. nor is it difficult to replace this Bone when dislocated. — A Fracture of the *Patella* may be either longitudinal or transverse, the last of which is the most frequent and difficult to reduce: but a compound Fracture, when this Bone is shattered, is still worse, and much endangers the Stiffness of the Joint, from a Luxuriancy of the *Callus* into the Articulation, which is the chief Accident we have to guard against in this

this Case, and which may also in part proceed from an Inspissation of the Synovia, since the Limb is obliged to be kept a long time extended. A longitudinal Fracture of the Patella is easily reduced, and as easily retained by the uniting Bandage with suitable Compresses, namely, a double-headed Roller, as in *Fig. 11. Tab. S.* placed on each side; but in a transverse or compound Fracture, after a careful Reduction, and the Application of a Plaster, or a Compress dipped in some antiphlogistic Liquor, a double-headed Roller is taken of about three ells long, and three fingers broad, applying the middle immediately above the Patella *a*, *Fig. 10. Tab. S.* from which descending with a circular round *d*, the Roller heads are crossed in the Ham, thence brought forward and crossed below the Knee, then carried back, crossed again in the Ham, and the same Course repeated as before, like a figure of 8, as long as the Roller lasts; and then the Leg is to be kept extended by Splints, or a wooden Box.

Q. 177. How do you treat a Dislocation of the Knee?

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A. This

A. This is when the Tibia slips from under the Head of the Femur, either on one side or backward; but hardly ever forward, from the Resistance of the Patella with its strong Tendons: for so firm is the whole Articulation, that a perfect Luxation seems hardly practicable without a Rupture of the Ligaments. There is no difficulty in reducing this Joint after a due Extension, unless the Ligaments are broke, which may be attended with most excruciating Pains, Convulsions, &c. if not timely relieved: but in both Cases great Care must be taken to prevent a stiff Joint, by giving it a little Motion every day. The same Bandage with Paste-board Splints will suffice here, as for a Fracture of the Patella (Q. 176.)

Q. 178. How do you treat a Luxation of the *Fibula*?

A. As this is sometimes separated from the Tibia, and distorted either upward or downward, when the Foot has been luxated outward; it will be proper in this Case to adjust its Situation, and retain it by a Bandage and Compress moistened with *acet. & sp. vini camph.* till the Ligaments have recovered their due Strength.

Q. 179.

Q. 179. How do you treat a Fracture of the *Leg*?

A. If the Fibula only is fractured, there is seldom occasion either for Extension or Reduction; and a Fracture of the Tibia readily manifests itself from the Nakedness of that Bone, which also gives a better Opportunity of adjusting the Fragments, if they point outward. To discover the Nature of the Fracture, I grasp the Calf of the Leg with one Hand, and cautiously move the Foot about with the other, so as to feel the Motion of the Bones by the Hand on the Leg. If the Fracture be compounded or complicated with a Wound, Splinters, Contusion, &c. I remove the Fragments or other foreign Bodies, suppress the Hæmorrhage and Inflammation, replace the Bones, and dress up the Limb with convenient Topicals and a foliated Bandage, *Fig. 1. Tab. K.* and finally, the Leg is to be retained in a wooden Box for the purpose, *Tab. L. fig. 12.* in which the former represents the whole put together, as the latter represents the several Parts asunder. In *Fig. 1. a* represents the Foot-board, which together with the Side-boards *fg*, are let down by the Hinges marked *dd* in *Fig. 2.* But when the bottom of the Machine *aa* is

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placed

placed under the fractured Leg, the Foot-boards and Side-boards are drawn up and fastened by the Hooks *ee. ff*, Fig. 2. represent the Basis of the Machine, which is raised higher or lower by means of the Pedestal *b* moving in the Notches *bb*; *gg* denote the Hinges which join the Basis and Bottom of the Machine together. — Over the Floor or Bottom of the Machine *aa* are nailed pieces of strong Ticken, upon which the Limb may rest with more Ease than upon the Board. The other Parts of this Machine compared with the entire Figure are sufficiently obvious.

2. 180. How do you treat a Dislocation or Fracture of the Bones of the Foot?

A. The Foot is sometimes dislocated either outward or inward, forward or backward, by jumping or other violence, as may be readily perceived by the Distortion and Posture of the Joint, the Foot inclining in an opposite direction to the Dislocation; but a Dislocation of the Ankle outward can hardly happen without breaking the lower Head of the Fibula, or tearing it from the Tibia, which is often attended with the most violent Inflammation, Pain, &c. even though there be no
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real Luxation; and therefore to attempt a Reduction would be here highly mischievous. If the Case is only a violent Strain or Laceration of the Ligaments without a Luxation, it will be convenient to bathe the Parts with *acetum Lithargyritum*, and put the Foot frequently in cold Water: but if the Ankle is dislocated, an Extension must be made by two Assistants, one taking hold of the Instep and Heel, while the other holds the Patient's Knee, and then the Astragalus with the lower Head of the Fibula are to be replaced by the Fingers, retaining the Compresses and Splints, when necessary, by the tarsal Bandage, *Tab. S. fig. 1. E.* made with a single or double-headed Roller, fastened first round the Ankle, then carried round the Instep, intersecting each other in the bending of the Instep like a figure of 8 about the Foot and Ankle.

Q. 181. How do you treat a Fracture or Luxation in the Bones of the *Tarsus*, *Metatarsus*, and *Toes*?

A. These from the Number and Vicinity of the Nerves, Tendons, &c. are often attended with violent Symptoms, and no small Danger; but, like other Bones, a Reduction

of them is not likely to be accomplished without a perfect Knowledge of their Articulations and Positions with respect to each other; whence it is evident, that a strict Examination of the Joints, furnished each with their respective Cartilages, Ligaments, Glands, &c. as they appear in a recent natural Skeleton, is an Article of the highest Importance in Surgery. After the Reduction, the Splints and Compresses are to be retained with the Bandage last mentioned.

Q. 182. How do you treat a Luxation or Fracture in the Bones of the *Fingers*?

A. By a gentle Extension and Reduction as in others, retaining the Compresses and Splints by the glove Bandage, *Fig. 6. Tab. T.* when the Disorder extends to several of the Fingers: but in compound Fractures of the Fingers with a Wound, I dress each of them apart with little foliated Bandages like that for the Leg, *Fig. 1. Tab. K.*

Q. 183. How do you treat Fractures and Luxations in the *metacarpal* or *carpal* Bones?

A. By extending them flat upon a Board or Table, as in those of the Tarsus and Metatarsus, and then reducing them by pressing with

with my Hands and Fingers: after the Bandage, I keep the Hand and Carpus extended betwixt two pieces of PASTEBOARD lined with soft Compresses.

Q. 184. How do you treat a Luxation of the Hand in the Joint of the *Wrist*?

A. This, like the Ankle, may be dislocated four ways; but more easily forward or backward than laterally, because the Carpus is guarded on each side by the Heads of the Radius and Ulna. The Reduction is made by extending the Hand over a Table, replacing the Bones by pressing with the Fingers, and retaining with Compress, Splints and Bandage.

Q. 185. How do you treat a Fracture in the *Cubitus*?

A. As the Cubitus or lower Arm contains two Bones, the Radius and Ulna, the former of which has a free rotatory Motion without being connected like the other to the Humerus, it is evident that a Fracture may happen either in one or both of these Bones. If one Bone is sound, it proves a better Support than either Splints or Bandage; but when the Fracture happens in the lower Part, it is strongly

ly drawn aside by the adjacent pronator quadratus Muscle towards the sound Bone, which with the other Circumstances of this Fracture may be readily perceived by feeling and moving the Bones with discretion. If a Fragment of the Radius is contracted towards the Ulna, I order an Assistant to hold the Arm, and incline the Patient's Hand towards the Ulna, to draw back the contracted Part of the Radius; which being restored, together with the quadratus Muscle, to a due Situation, I retain them by the Application of convenient Compresses, Splints and Bandage: but in setting a Fracture of the Ulna, I incline its Head towards the Thumb, and proceed as before. If both Bones are broke, a convenient Extension is to be made, when necessary, in a right Line, reducing and retaining the Fragments as before.

Q. 186. How do you treat a Dislocation of the Elbow?

A. In this Joint the Head of the Humerus and Ulna are articulated mutually into each other like a Hinge, which is termed *Ginglymus*; so that it is very difficult for a perfect Luxation to happen here, without the Olecranon (or Head of the Ulna, called the Elbow, analo-

analogous to the Patella) should chance to be broken off. If the Cubitus be luxated backward and upward, which is most frequently the Case, (it being more difficult for it to recede laterally, and impossible forward, without a Fracture of the Olecranon) the Arm becomes shorter, cannot be extended, and is accompanied with the most severe Pains, Inflammation, &c. from the Distraction of the Ligaments and Tendons, which if not timely relieved may produce Convulsions, Vomiting, Fever, Gangrene, and Death; nor is it easy to replace this Bone, if it has continued any time out; though this must be endeavoured by a pretty strong Extension made by two Assistants, till one can feel the Bones at liberty in the Joint to be replaced. After the Reduction, the Inflammation must be taken off by bleeding and fomenting, cooling Purges, &c. securing the Joint with Compresses dipped in *sp. vini camph. vel acet.* and retaining them by a moderate Bandage applied as for bleeding in the Arm, *Tab. S. fig. 1. D.*; which is to be afterwards suspended in a Napkin or Sling hung about the Neck, *Tab. M. fig. 7.*

Q. 187. How do you treat a Fracture of the Humerus? A. A

A. A Fracture near the upper or lower Head of this Bone, is much more dangerous than in its middle, as the large Blood-vessels and Nerves lie near; and an oblique Fracture in a strong muscular Patient, is very apt to contract or shorten the Limb by the Ends of the Bone riding the one over the other; whereas they sustain each other, when the Fracture is transverse. In order for the Reduction, the Arm is first to be extended by two Assistants, one holding the Patient's Shoulder above the Fracture, and the other (taking hold of the Arm below the Fracture, with the Elbow a little bent) continues to extend it gently forward in a right Line, while the Fragments are in the mean time reduced to their proper Situations by a judicious Application of the Hands and Fingers; and lastly, after the Application of a Roller dipped in Vinegar, the Arm is secured with three Splints and Compresses, as at *Tab. M. Fig. 7.* *a a* tied over the Bandage by the Strings *b b b*, making the knots on the outside of the Arm, which is suspended by a Sling or Napkin about the Neck *c c c* tied in a knot upon the Shoulder *d*, and sustaining the Pasteboard Case *e* when the Fracture is in the Cubitus, this last being unnecessary in a Fracture of the Humerus. 2, 188.

Q. 188. How do you treat a Luxation of the *Humerus*?

A. This Joint from the Length and Laxity of its Ligaments, with the Largeness of its Motion, and the Shallowness of the Cavity in the Scapula, is extremely liable to Dislocation; in which the round Head of the *Humerus* may be displaced either forward, backward, or obliquely downward in the Arm-pit, or even below the Scapula, but seldom perpendicularly downward, and never upward without a Fracture of the Acromion and coracoid Process of the Scapula; to which add the Resistance of the strong deltoid and bicipital Muscle. The displaced Head of the Bone may, for the most part, be readily perceived by the Fingers applied to the Axilla; and if it is found forward and downward, it will be apt to compress the axillary Nerves and Blood-vessels, whence a Numbness of the Fingers and Arm, with a Palsy, &c. may follow. Here therefore it will be necessary to make an Extension as soon as possible, keeping the arm in a right Line, while the Head of the *Humerus* is agitated one way or the other, so as to direct it by the Hands towards the Cavity in the Scapula. If the Hands alone are not sufficient for this

this purpose, it may be convenient to make use of the Machines, *Tab. I* and *K.* The Bandage here is the simple *Spica*, *Tab. T. fig. 2.*

Q. 189. In what Case is the Amputation of a Limb necessary?

A. Chiefly to prevent a spreading Mortification from invading the whole Body, and from destroying the Patient, as it often otherwise would, when the Muscles or Bones of a Part are violently shattered, invaded with a Gangrene, Caries or *Spina ventosa*, or when the brachial, crural, or other large Artery or Nerve is divided, or obliged to be intercepted by Ligature, &c. so as to cause a Mortification.

Q. 190. How do you amputate a Finger or Toe?

A. These are frequently taken off by cutting Pincers, or by a sharp Chissel; but it seems in my Judgment much the easiest and better way, in these small Members, to divide in the next sound Joint with a Scalpel, drawing up and leaving a sufficient Portion of the Skin to cover the Stump, and expedite the Cure; and by this means one is sure to avoid a supervening Caries, or a splintering of the Bone, to which the former Methods
are

are liable. After Amputation I dress with scraped Lint, Compress and Bandage. The Hæmorrhage will cease by the Application of *Alcohol vini*, if it should prove excessive; and afterwards I dress with some vulnerary Balsam spread on a Pledget of soft Lint, retained by a sticking Plaster and Compress cut in shape of a *Malta* Cross, or else with two long Slips of Plaster laid across each other over the Stump, then a Compress and a circular Bandage.

Q. 191. How do you *amputate* the Hand?

A. This I amputate at least one or two finger's breadth above the Mortification or Caries, never in the Joint itself in these larger Amputations; because of the difficulty of healing the Stump. Having therefore marked the Place, and disposed my Apparatus in order, I place three Assistants round the Patient, as in *Tab. Q. Fig. 1.* ordering the Assistant *d* to draw up the Skin tight, and then proceed to apply a piece of Tape about an ell long circularly round the Limb, the better to guide the Incision, which I next proceed to make (having first secured the Artery in the Arm above by the Tourniquet, *Tab. S. fig. 1. K.* which is to be taken care of

of by the Assistant *d*) with the Scalpel, *Fig. 1. Tab. O.* Having divided the Skin, I order the Assistant *d* to draw it up as much as possible, and then proceed to cut through the Flesh to the Bones circularly, and close to the edge of the retracted Skin, with the large crooked Knife, *Tab. O. fig. 2.* and then I divide the intermediate Flesh and Ligament betwixt the Bones by the double-edged Catlin, *Tab. O. fig. 3.* with which I also separate the Periosteum a little both from the Radius and Ulna, to prevent its being lacerated by the Teeth of the Saw, *Tab. O. fig. 4.* which I next apply on the outer side of the Arm, as in *Tab. Q. fig. 1. b.*, ordering the Assistant *d* at the same time to draw up the Flesh as much as possible, to open a Passage to the Bones, that they may be cut off a little higher than the Incision, and that the Flesh may afterwards wrap over them; to do which the more effectually, the Flesh may be drawn up from the Bones by a piece of Linnen with a slit in it, the two ends of which may be pulled up by the Assistant *d*; and thus the Flesh and Skin being longer than the Bone, and folding over the Stump, will greatly hasten the Cure. I now continue to work the Saw upon both Bones after they have been
gently

gently entered by the Teeth, with which I cut through them in less than a minute, being careful to have both Bones divided at the same time without splintering them. The Limb being thus off, I order the Assistant *d* to relax a little the Tourniquet, that by the starting forth of the Blood I may discover the Ends of the Arteries, which I then secure by Ligature with a crooked Needle and waxed thread, which should be pretty broad to prevent it from cutting through the Coats of the Artery, which I thus intercept, together with the circumjacent muscular Flesh, by passing the Needle twice round, and securing the Ligature by the Surgeon's Knot, at the same time carefully avoiding to intercept any adjacent Nerve by the Ligature, which might occasion Convulsions and the worst Symptoms. Some indeed not only tie up a Portion of the circumjacent muscular Flesh together with the Artery, but pass the Needle transversely through the said Flesh and end of the Vessel, in order to prevent the Ligature from slipping off, or cutting through the arterial Coats; but in most Cases the first Method will suffice. The Method by the Pliers and Ligature only, *Tab. Q. fig. 2.* is apt to let the Artery slip through. In the next place

place I apply to the end of the Stump some Dossils of dry Lint, charged with a fine absorbent or styptic Powder of Bole, Starch, black Rosin finely levigated, &c. to which add the *Fungus pulverulentus*, or Puff-ball cut into slices; though in reality fine dry Lint will answer the Intention equally as well, or rather better, as it leaves the Surface of the Wound cleaner; observing to lay on the Lint unequally, according to the Situation of the Parts; thickest upon the Vessels which discharge most, and then securing the whole with an oiled Bladder, it is retained moderately firm upon the Stump with Compress and Bandage, rather lax than too tight. Then the Patient is bled, if necessary, and disposed to rest; and if the Dressings sit easy, they are not to be removed before the third or fourth day, unless severe Pain, Inflammation, Hæmorrhage, &c. should make it necessary; nor even then should the Portions of Lint be taken off, unless they are in a manner ready to drop off spontaneously without any Adhesion; absorbing the Matter by the gentle application of dry Lint, and not by a rough wiping the Surface. The next Dressing may be made either with dry Lint, or a Pledget spread with some digestive Ointment,

ment, retained upon the Stump by six long slips of Emplaster, crossed over each other like a Star, and then the Bandage applied tight enough to retain the Dressings, but not to cause any Uneasiness; for provided the Dressings are kept on, as the Arteries are secured by Ligature, no matter how loose the Bandage. In the mean time the Patient must be kept under a proper Regimen, as in other great Wounds (Q. 145.), handling the Stump tenderly for fear of a fresh Hæmorrhage.

Q. 192. When and how do you procure an Exfoliation of the Bone in the Stump?

A. This is only necessary when the End of the Bone has been so much injured, or so long exposed to the Air, as to destroy the Vessels in its Surface; but if Care be taken immediately after the Amputation to exclude the Air by applying a small Dossil of Lint, dipped in *Fryer's Balsam*, or in Tincture of Mastic, to the End of the Bone, the Stump may be cicatrized without any Exfoliation of the Bone, if the Flesh and Skin saved are gradually brought over it by rolling the Limb, but not so tight as to give uneasiness.

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Q. 193.

Q. 193. How do you amputate the *Humerus* above the Elbow?

A. Much in the same manner, and with the same Precautions as in the *Cubitus*, only with greater Circumspection and Care afterwards, as this is attended with more Danger; and observing here, as before (Q. 191.) to save as much of the Limb as possible.

Q. 194. When and how do you amputate the Arm in its Articulation with the Scapula?

A. This is never performed but when a Mortification has extended to the Joint, or when the Head of the *Humerus* is shattered or carious; and the Instances thereof are very rare in Practice. We have an Account of it as performed by *Le Dran*, *Obs.* 43. and by *La Motte*, *Traite complet de Chirurgie*, *Tom.* 3. *p.* 423. and it was performed with Success at *Paris*, *Sept.* 24. 1730. by *M. Du Verney*, in the Presence of *Dr. Boerhaave*. The Patient's Arm being extended, he first made a strong Ligature upon the great Artery, by passing a Needle round it under the Axilla to prevent a Hæmorrhage; and then divided the Flesh (the pectoral and deltoide Muscle)

Muscle) and Skin by a semicircular Incision, leaving enough to cover the Amputation; afterwards he divided the Ligaments and Capsule, which connect the Head of the Humerus to the Scapula. But great Care must be taken that the Artery is well secured by Ligature, and to avoid wounding it in the Amputation; which being compleated, the Artery is then to be searched for and secured by another Ligature above the former upon the Vessel only, by passing a small crooked Needle, armed with a pretty broad waxed thread round it, and then the first Ligature which intercepted the Flesh, together with the Vessel, may be removed to prevent Inflammation. Then the Flesh and Skin are to be brought together to close up the Sinus of the Wound, which is to be filled with dry Lint retained by a sticking Plaster in shape of a *Malta* Cross, with Compress and the spica Bandage, *Tab. T. fig. 2.* In case of a spreading Mortification after this Operation, Bounds must be prescribed to the spreading Disorder by the application of a Pencil-brush dipped in a Solution of Mercury in Aqua fortis; and this with a proper use of the Bark internally, may procure a Separation of the dead from the living Parts,

which when reduced to the State of a clean Wound may be healed in the same manner. Such an Amputation was accidentally made in *August* 1737, in the Arm of a poor Miller torn off. See *Phil. Trans.* N^o 449. P. 313.

Q. 195. How do you amputate the Foot?

A. Here, contrary to an Amputation of the Cubitus, the Leg must be taken off a little below the Knee, even though the Disorder extends no farther than the Foot, to avoid a long and useless Stump, which can be only an Incumbrance and Deformity to the Patient; whereas the Cubitus is to be amputated as low as possible, since the Stump may be useful upon many occasions, and may be better adapted to an artificial Hand; but after a loss of the Foot, a long Stump cannot be commodiously adapted to a wooden Leg, which must be fastened to the Knee. I proceed in the Amputation in the same manner as before-mentioned in the Cubitus, applying the Tourniquet first to the Thigh, in the manner represented *Fig. 1* and *6. Tab. R.* finishing the Operation as before (Q. 191.) by standing within-side the Leg, *Tab. R. fig. 1. b.*

Q. 196.

Q. 196. How do you amputate the Thigh?

A. This must be done within two fingers breadth of the Patella, or else as low as possible, being very careful to give the Artery a due Compressure by the Screw Tourniquet, or by that made with a Ligature and the Turnstick, as represented *Fig. 1. LM. Tab. S.* for as the femoral Artery is extremely large, an Error in this respect may occasion a fatal Hæmorrhage in a minute's time. After the Amputation, as before directed, the femoral Artery is to be well secured by a Ligature, without intercepting the Nerve; and Ligatures must be likewise made upon the other smaller Arteries, which bleed considerably: the quantity of Lint here applied must be greater than in other Amputations, the other Dressings must be proportionably larger, and a long Compress must be secured by the Bandage upon the crural Artery by a Roller carried down the Thigh, or else the Tourniquet must be kept upon the Limb to abate its Impulse, and prevent a fresh Hæmorrhage; and the Dressings are to be retained either by the capeline Bandage, *Tab. E. fig. 14.* or the Hands of an Assistant upon the End of the Stump; which last is most advisable, especially for the first day or two, observing to treat the Patient

with a proper Regimen and Medicines; as in other great Wounds (Q. 145.) If the End of the Bone should be carious, as not unfrequently happens, it must be pared away by the Scalpel till the sound Bone appears; which will then readily unite with the Flesh to compleat the Cicatrization, provided it be well guarded from the Air by a Pledget dipped in *Fryer's Balsam*, or Tincture of Mastic. It must be owned, that the profuse Discharge of Matter which is often made from the Stump, greatly reduces, and often destroys a weak Patient; but this may be in a great measure remedied by the application of Lint dipped in *alcohol vini* saturated with *colophonium inguum*, or in *Fryer's Balsam*, with a proper use of the Bark internally; taking care at the same time to keep the Skin and muscular Parts from retracting and leaving the Bone, by the use of a moderate Bandage. If Opiates are found necessary, they must be used sparingly and with great Caution, as they thin the Blood, and have been often observed to renew the Hemorrhage.

Q. 197. What is *Phlebotomy*, and with what Precautions do you perform it?

A. This

A. This is an artful and careful Opening made in some of the more conspicuous Veins by the common and well known Instrument a Lancet, (*Tab. III. fig. 1.*) chiefly in the Neck, Arm, Hand or Foot; being the most ancient, effectual and extensive Remedy upon most occasions with which we are acquainted, but requires Judgment in the Performance, to avoid the adjacent Nerves, Tendons or Arteries. To bleed in the Arm, after providing a Fillet, Compress, and a bit of Cerate Plaster, &c. I single out the Vein which presents best, and apply the Ligature moderately tight above the Elbow by two circular rounds about the Arm, and with a slip-knot (*Tab. II. fig. 4.*); then chusing out a Lancet either broad (*Tab. III. fig. 1.*) or spear-pointed (*ib. fig. 3.*) in proportion to the depth or rising of the Vein, place it betwixt my Teeth with the Blade removed from the Handle, so as to form an obtuse Angle, and in the mean time rub the Arm from the Hand upward, to make the Vein appear more conspicuous; and then pressing with my Finger to discover the Vicinity of the Artery, Nerve or Tendon, I make a small Impression with my Finger Nail upon the Skin where the Vein appears best for opening; I

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then

then place my left Thumb upon the Vein a little below the Impression to keep it steady, and taking the Lancet betwixt my right Thumb and Fore-finger, resting upon the other Fingers almost as one would hold a Pen, I plunge the Point into the Vein, so as to make an Orifice tolerably large by an oblique Incision carried upward by raising a little the Point, which I then instantly withdraw, and press my left Thumb upon the Orifice, till the Receptacle is ready to receive the Blood, which if obstructed from flowing freely by too great Pressure of the Ligature upon the Artery, I slacken it a little, and relax the Skin and Vein by bending the Arm in a small degree, which is then to be supported by a Stick, which the Patient should keep turning round. In this Operation one must observe, (1.) If there are many Cicatrices in the Skin from previous Bleedings; to open the Vein immediately below the last, if nothing forbids. (2.) That the Skin and the Vein be not distorted from their natural Situations in applying the Ligature, or by pressing the Thumb at the time of Incision; otherwise the Orifice of the Skin and that of the Vein will not correspond, which if it should happen, they are to be assisted by moving

moving the Arm or Skin at discretion, or by enlarging the Orifice. (3.) That a tolerable large Orifice is always preferable to a small one, as the last, especially when the Incision is near a Valve, is commonly attended with a Thrombus or grumous Concretion, or else permits only the more fine and healthy Parts of the Blood to escape. (4.) That if the Vein lies deep, it must be opened by a Lancet with narrow Shoulders; but if it lies superficial, it may be better opened by a Lancet with a broad Blade, or an obtuse-angled Point; and though the first kind of Lancet, that is, the small or spear-pointed with a short Blade, always bleeds easiest in a skilful Hand, yet the broader kind is safest for Beginners, to avoid injuring the large Artery and brachial Nerve which lie under the basilic Vein, and the Tendon or its Aponeurosis of the biceps Muscle which lie under the Median.

Q. 198. How do you dress after the Operation of Bleeding?

A. After wiping off the Blood, and closing the Lips of the Orifice in their natural Posture, (as the Skin is apt to contract, and occasion the Fat to protrude, which leaves a trouble-

troublesome Ulcusculæ, or at best since it thus unites with a large Scar) I endeavour as much as possible to retain the Skin together with a bit of Diapalma Plaster, in the middle of which is fixed a bit of clean linnen sufficient to cover the Orifice ; over this I apply a square Compress of sufficient thickness, and retain it by the Fillet of about an ell long, one end of which is applied obliquely across the Arm over the Compress, letting enough of it hang loose above the Elbow to tie in a knot, then the other part being carried round below the Elbow and up again, crossing the former upon the Compress, is carried round above the Elbow, and so on like a figure of 8, leaving enough to tie with the other end in a knot, on the outside of the Arm above the Elbow, as in *Tab. S. Fig. 1. D.*

Q. 199. When and how do you bleed in the Foot or Hand?

A. In the Hand there are two Veins, the Splenica running on the Back towards the little Finger, and the Cephalica betwixt the Thumb and Fore-finger, which in Children and in some grown People, where the other Veins are not conspicuous, may be opened to advantage. After having first bathed the Hand well
in

in warm Water, and fixed a Ligature upon the Carpus, an Orifice is then made by the Lancet, as before directed; and if the Blood does not run freely, the Hand is to be kept in warm Water till a sufficient quantity is discharged. In the same manner also is the saphena and cephalic Vein in the Foot to be opened, after bathing it in warm Water, and tying the Garter tight about the Knee, or rather above the Ankle; but it may be safer, easier, and equally useful to open a Vein at the Ankle, or near the Calf or Ham, if the Veins appear there more conspicuous, dressing the Orifice as before (Q. 197.), and retaining the Compress by the Bandage described for a Luxation of the Ankle, *Tab. S. fig. 1. E.* Bleeding in the Foot is justly reckoned to make a greater Revulsion than that of the Arm in Disorders of the Head, Thorax, and abdominal Viscera, especially in a Suppression of the menstrual or hæmorrhoidal Flux.

Q. 200. When and how do you open the occipital or the jugular Vein in the Neck?

A. Here the Vein is to be first rendered turgid by a Neckcloth, or the common Ligature, drawn and held tight about the lower Part of the Neck by the Patient, or an Assistant;

ant; then pressing my Thumb upon the Vein which appears fairest, (on the disordered Side, if possible) I make an Orifice agreeable to what was before directed, applying a bit of Plaster compress, and a circular Bandage after the Operation is finished. Bleeding here is preferred for most Disorders of the Head, Brain, Eyes, &c. though it is not so commonly in practice as it deserves. — Sometimes a less considerable Vein is opened nearer the inflamed or disordered Part itself, as in those which run down on each side the Nose; in the Canthi majores or inner Corners of the Eyes, for an Ophthalmia; in the Veins under the Tongue, for a Quinsy; the Vena dorsalis penis, in a Priapism, &c.

Q. 201. What are the principal Accidents which may happen to an ignorant or careless Surgeon in the opening of a Vein?

A. They are, 1. An *Ecchymosis*, or Extravasation of the Blood from the Vein into the cellular Membrane betwixt the Flesh and Skin, either from the Vein being cut in two, or from a too early and violent Exercise of the Arm before the Orifice is closed; in which Case, if a Discussion cannot be procured, it must be brought to Suppuration, as we directed before.

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2. The Puncture of a *Nerve* or *Tendon*, which is instantly attended with most excruciating Pain, soon followed with an Inflammation and Swelling of the Limb, which often ends in Convulsions, a Gangrene, or Death, if not timely relieved: all which must be prevented, if possible, by repeated Bleeding in the other Arm, by cooling Purges and Clysters, with a diluent antiphlogistic Diet, and two or three drops of *Balsamum Peruvianum* made warm, and applied to the Orifice with some Lint, keeping the Arm a little bent in an easy Posture.

3. A Puncture or Wound of an *Artery*, which will plainly manifest itself by the Blood flying out by starts with great Impetuosity of a very florid Colour, and which will probably produce an Aneurism, or a Gangrene, and Death, if not timely remedied by the application of a bit of Lead, of a suitable shape, folded up in a piece of clean Linnen, and retained as a Compress on the Artery by a strict Bandage; or rather, a Compressure is to be made upon the Artery by the Instrument described in *Tab. A. Fig. 1, 2.* After this a long Compress is to be secured upon the humeral Artery by a pretty strict spiral Bandage, to break off the Impetus of the Blood from

from the Part affected; and the rest of the Treatment may be conducted as for the Puncture of a Nerve or Tendon, by which means a true or spurious Aneurism, and their several Causes, may often be prevented.

Q. 202. But is not an Artery sometimes opened with Design?

A. Never but when it is small, and seated upon some resisting Bone, which will suffer it to be compressed so as to prevent an Aneurism, as in the temporal and other Arteries of the Pericranium,

Q. 203. When and how do you perform *Arteriotomy* in the Temples?

A. For most of the obstinate Disorders in the Head and Brain, which will not yield to other Remedies, and especially in Apoplexies and Epilepsies, &c. in which Cases, after inclining the Patient's Head opposite to the Light, I place my two foremost Fingers upon the Artery at a little distance from each other, and boldly make an Incision obliquely across it, by the strong double-edged Scalpel, *Tab. 1. fig. L.* without injuring the subjacent Aponeurosis, and not fearing if the Artery should be totally divided, since any bad

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Consequences may be here prevented by suitable Compress and Bandage. After the Artery is opened, which I know by the strong and salient Efflux of the Blood, I suffer the Patient to bleed twenty or thirty ounces more or less, and then apply three square Compresses, including in the first a bit of Lead or Emplaster rolled up tight, laying on the other two larger Compresses, and securing the whole by the knotted Bandage, *Tab. S. fig. 3.* which must be kept tight upon the Part for near a Fortnight, to prevent an Aneurism.

Q. 204. What are the Nature and Signs of an *Aneurism*?

A. An Aneurism is a soft and usually a throbbing Tumor full of Blood, formed either by the Dilatation or a Division of an Artery; which first denominates it a true, and the latter a spurious Aneurism. A true Aneurism is known by its having always a Pulsation in some Part or other, disappearing by Pressure, and returning again afterwards; but a spurious Aneurism is when the Artery, being divided, extravasates the Blood betwixt the Muscles and Integuments, whence the Part appears livid, distended with little or no Pulsation.

Pulsation, but intense Pain and an extraordinary Swelling, tending either to Abscess or Mortification. Internal Aneurisms are commonly formed by too great a Distension of the arterial Coats by some Strain or other Violence, whence as the internal Coat will not dilate so much as the external, and by the bursting of the internal Coat, the exterior Parts are extended into a Tumor, till suddenly breaking, a Period is instantly put to the Patient's Life; whence it is evident, that no Relief can be given in this Case, but by keeping the Force of the Heart and Arteries low by frequent Evacuations of all kinds, especially bleeding every Month or Fortnight, and feeding on a poor and spare vegetable Diet, avoiding all Passions, Exercise, spirituous and stimulating Substances of all kinds, or any thing which increases the Blood's Motion.

Q. 205. When and how do you perform the Operation for an *Aneurism* in the Limbs?

A. For an Aneurism in the Arm, the Tourniquet is first applied above in the Humerus, tightening it till no Pulsation is perceived in the Artery at the Carpus; after which a longitudinal Incision is to be made
from

from below upward, that the Artery on each side the Aneurism may be freed from the adjacent Nerves, and exposed to view: in the next place, a pretty broad Ligature is conveyed round the Artery above and below on each side the Tumor, by the obtuse-pointed Needle, *Tab. A. fig. 5.* and after tying the Ligatures tight, the aneurismatic Tumor is laid open by Incision, and its Contents discharged without cutting the arterial Coats in two transversly. If the Ligature be not very broad, some Lint must be interposed betwixt it and the Artery, to prevent it from being cut through. The Wound is filled with dry Lint for the first time, and afterwards with Digestives, till the Ligatures and diseased Part of the Artery are cast off, and the Cure compleated, as in other Wounds. The same Method is to be taken with a spurious Aneurism, after making an Incision through the Integuments, and discharging the extravasated Blood, whence the Arm is often saved from an Amputation, or from a spreading Gangrene, which would in time be fatal. In this manner also, with little Variation, are to be treated Aneurisms in other Parts of the Body, where the Arteries are accessible, as behind the Ears, in the Hands, Legs and Feet, &c.

Q. 206. In what Parts, and how do you make *Issues*?

A. These are small artificial Ulcers, best made by pinching up the Skin and Fat betwixt the Thumb and Fore-finger, and dividing them with a Lancet so far as to be capable of admitting a large or small Pea, by which they are kept open and running for Disorders of the Head and Lungs, in which they frequently afford some Relief. The Places in which they are usually made for these Purposes are in the upper Part of the Head, or in the Neck over each Scapula; in the Arms near the Insertion of the deltoide Muscle; within-side the Thighs a little above the Knees, &c. but to produce any considerable Effect, there ought to be several Issues in these Parts, and their Discharge promoted by an artificial Pea of Wax mixed with some strong digestive Substance, as *pulv. cantbarid. gum. myrrh. & elm.* or by dressing the Pea with *ung. episp.* &c. But Issues are sometimes made by the Caustic, as mentioned before (Q. 24.), when the Patient will not admit of the Knife.

Q. 207. What is a *Seton*, and how do you make it?

A. This

A. This is a kind of double Issue made by pinching up the Skin and Fat either by the Pincers, or with the Fingers, *Tab. M. fig. 56.* and then perforating them by the Seton Needle, *Tab. G. fig. A.* armed with a skain of thread or silk, either loose or twisted together, and spread with some digestive Ointment, which being shifted or drawn through the Integuments a little every day, keeps them open and running as in an Issue; but as this is more troublesome, and of no greater use, we commonly prefer an Issue above each Shoulder, which will answer all the purposes of other Issues, for which they are made.

Q. 208. When and how do you cup and scarify?

A. This is rarely the Business of the Surgeon, except in the Country or at Sea, and in case of a Gangrene. It is distinguished into, (1.) *Dry Cupping*, when the Glass, *Tab. M. fig. 1.* being applied to the Skin, the Air is rarified by the Flame of a Spirit of Wine Lamp, which being withdrawn with great Celerity, the Glass is pressed close to the Skin, which is considerably raised and swelled into the Glass by the incumbent Pressure of the Atmosphere; so that thus an

artificial Inflammation is raised in the same manner as by violent Frictions of the Skin, to derive the Blood and Humours towards and into the Part cupped, and to make a Revulsion of them from some other Parts affected. And these Purposes are more effectually answered, (2.) by *scarifying* at the same time, that is, by applying the Scarificator, *Tab. M. fig. 4.* with the sixteen Lancet Points to the Skin, into which they are suddenly struck by letting loose the Spring-handle *a*, by depressing the Button *b*; and then by applying the Cupping-glass as at first, a considerable quantity of Blood is drawn from the Incisions, so as to answer all the Purposes of bleeding in other parts when no Vein can be found, or when it would not be so safe to open a Vein, on account of the Patient's Lowness. Thus it may be applied with great success to the Occiput for Apoplexies, Head-achs, Disorders of the Brain and Eyes; and upon the affected Side in a Pleurisy, after Phlebotomy, it gives great Relief, as also in all local Inflammations, Pains, &c. But chirurgical Scarification is commonly made by the Scalpel or Lancet in Gangrenes, Mortifications or Dropsies, to discharge the offending Humours,

mours, and make way for the topical Remedies to penetrate into the sounder Parts.

Q. 209. What is the *Fistula lachrymalis*?

A. This is of two kinds, *true* or *false*. The latter is when the lachrymal Ducts are only obstructed and dilated, so that the Tears cannot pass from the Eyes into the Nose, but are forced to run down over the Cheek; but the true *Fistula*, besides the former, is accompanied with an Ulceration in the lachrymal Sack, and a purulent Discharge: and this is properly the *Fistula lachrymalis*, as the other is rather an *Epiphora*, or watery Eye; which last may proceed from a great Number of Causes forming an Obstruction or Concretion of the forementioned Ducts, and occluding the Passage of the Tears into the Nose. The true *Fistula* is either *perfect*, accompanied with an external Ulceration, and a purulent Discharge; or *imperfect*, when the outer Integuments remain entire, the Matter being discharged into the Nose only, and a considerable Tumor appearing internally. The Disorder is worse, as the Ulcer is more inveterate, and complicated with a Callosity, or a Caries of the adjacent Bones, as the *Os lacrymale*, *Os planum*, and the *Os*

maxillare superior. Sometimes the purulent Matter makes its own way through the lachrymal Points, or may be easily forced out that way by Pressure, though the Integuments remain entire; and if the nasal Canal be obstructed, all or most of the Matter is obliged to return up to the Eye through the Puncta lacrymalia, little or none passing into the Nose by the Canalis nasalis. But sometimes there is no Matter at all discharged in this Disorder; which often proceeds from an inflammatory Tumor in the greater Canthus of the Eye sometimes tending to Suppuration, which Tumor is called Anchylops before it tends to suppurate, and Ægylops when Matter appears: and it must be therefore treated accordingly, by endeavouring to disperse it in the first place, or to bring it to Suppuration in the last, to prevent an obstinate Fistula, or a Caries of the adjacent Bones from the spreading Disorder. A free Discharge must be given to the confined Matter, by making a sufficient Opening with a Scalpel: or when the Fistula is incipient, and the Membranes not yet corroded, it may be often cured by making a Compressure with Compresses upon the Sack in the greater Canthus, so as to prevent the Humours from being retained and corrupted,

corrupted, frequently injecting a Mixture of *S. V. & aq. calc.* with a small Syringe and capillary Tube (*Tab. X. fig. 4.*) passed through the Punctum lacrymale. But if this does not suffice, the lachrymal Sack must be laid open by an oblique Incision downward, or one convex towards the Nose, without wounding the lachrymal Ducts, Points or Tarfi of the Cilia. Then the Callosity is removed by Digestives, and the Caries likewise, either by scraping the Bone, or removing so much of it as is vitiated; after which the Os lacrymale is to be perforated to give a Passage to the Tears into the Nose, keeping it open by a small Canula or leaden Probe, completing the rest of the Cure as in other Wounds. But this Operation may be prevented, if the Disorder is taken in time, and the Ducts cleared, by introducing a small capillary Probe, which by a proper Management will pass through the lachrymal Sack to the nasal Canal; after which an Injection must be conveyed by the Syringe and capillary Tube to cleanse, open and heal the Parts; in which Method the Patient must continue, till the Injection passes freely into the Nose without any appearance of Matter. These Passages may be still better opened and cleansed by

the Probe and Injections, when there is an Opening immediately through the lachrymal Sack into the Integuments. If it is judged best to make a Passage into the Nose by perforating the Os unguis with a small Trocar, Care must be taken not to mistake the Os planum for it, which would cause the Opening to be into the *Antrum Highmorianum*. But the Method by probing and injecting is of all the best to one well acquainted with the Structure of the Parts, which ought at least to be tried before Incision with the use of Escarotics, &c.

Q. 210. What is a *Cataract* and *Glaucoma*?

A. A *Cataract* in general may be defined an Opacity and Discolouration in the Humours of the Eye, obstructing the Light and visual Rays of Objects in their Passage thro' the Pupil to the Retina. If this Opacity is in the vitreous Humour, it does not appear so white or pearl-coloured, as when in the crystalline Lens, and is therefore called a *Glaucoma* from its grey Colour: but a *Cataract* properly so called is an Opacity of the crystalline Lens, tho' till of late it was supposed to be a Membrane floating in the aqueous

ous Humour; but where there is one of these membranous Cataracts, there are a thousand of the former, and therefore we may define a Cataract not a Membrane, but an Opacity of the CrySTALLINE. Hence Cataracts are distinguished into *true* or *false*, the Seat of the first being in the CrySTALLINE, and of the latter, either in the vitreous or aqueous Humour; though some call the Amaurosis or Gutta Serena, (which is a Palsy of the Retina or optic Nerve) by the Name of a *Black Cataract*, even though there is no visible Defect in the Eye. The *true Cataract* is again distinguished from its Colour and Consistence into white or grey, *mature* or firm, or immature and *shaking*, and with or without *adhering* to the Uvea. This may be easily distinguished from an Albugo or Speck in the Lamellæ of the Cornea, as also from the Pterigium or Unguis, which is a Film adhering to the outside of the Cornea; and lastly from the Hypopyon, which is a Collection of Matter in the aqueous Humour immediately behind the Cornea. The true Cataract and the Glaucoma, as well as most other Diseases of this Organ, follow from an Inflammation arising from any Cause in the small Arteries, which are distributed from the Retina

tina through the vitreous Body and crystalline Lens, and which have been sometimes manifested to the naked Eye by a happy Injection.

Q. 211. How do you treat the *Glaucoma* and *Cataract*?

A. The former is incurable by any Operation; but the ripe consistent *Cataract*, that is, the opaque crystalline Lens, may be couched or pressed down to the bottom of the vitreous Humour by a Needle, after inciding its Capsule by the same Needle, and the vitreous Body in the mean time coming forward, will with the aqueous Humour fill up the space of the Crystalline, so as to give the visual Rays of Objects a free Passage to the Retina, and restore Vision by the help of a Pair of convex Spectacles. In order to couch the *Cataract*, after the Patient is conveniently secured by two Assistants, with his Head reclined opposite to the Light, I take the Needle, *Tab. X. fig. 1.* and holding up the Eye-lids with the Finger and Thumb of the other Hand, or by the *Speculum Oculi*, *Tab. X. fig. 5.* I order the Patient to turn the Eye towards his Nose; then holding the Needle as one would a Pen, resting the lower fingers upon the Cheek,

Cheek, I carefully enter its Point about the middle of the White, betwixt the Cornea and external Angle of the Orbit, *Tab. II. fig. 5.* at about the sixth part of an Inch from the Cornea, and thrust it perpendicularly thro' the Coats of the Eye down to the Cataract, which being entered about the middle, after dividing its Capsule by the Edge of the Needle, is then depressed to the bottom of the Eye, below the Pupil, and the Needle is to be withdrawn cautiously, that the Cataract may not rise again, which compleats the Operation. If the Cataract is found to adhere, it must be first separated by the Needle before it is couched; and if it should not appear consistent enough to bear the Resistance of the Point of the Needle, the couching of it may be better referred to another Opportunity, when it is come to greater maturity. The Eyes are then both of them bound up (*Tab. S. fig. 4.*) and the Head retained for a considerable time in a Posture as erect as possible, to prevent the Cataract from rising, which will require it to be couched again. In the next place the Patient is to be bled, and treated with an antiphlogistic Regimen to prevent an Inflammation; and as Sickness at Stomach with vomiting generally follows after the Operation, from the
Consent

Consent of the Nerves, a cooling Stomachic and anodyne Draught should be given, to compose the Patient to rest as soon as possible, and the Bowels are to be kept loose. The famous itinerant Oculist Dr. Taylor makes an Incision with his Needle first in the vitreous Humour under the crystalline Lens, and then inciding the Capsule of the Crystalline, he couches the opacous Lens, by depressing it under the vitreous Humour without wounding the ciliary Ligaments.

Q. 212. How do you dress after couching?

A. In the first place a Compress dipped in some cooling Liquor is applied and retained upon the Eye by the Bandage, *Tab. S. fig. 4.* and the like is repeated upon the other Eye, if that is also disordered; and the whole Head may at last be invested by the Grand-kerchief, *Tab. S. fig. 1.*

Q. 213. What is an *Hypopyon*, and how do you treat it?

A. This is a Collection of purulent Matter immediately in or behind the Cornea, from an Inflammation and Suppuration proceeding from any violent Cause. In order
to

to remove this Complaint, the Inflammation and Matter must be dispersed if possible by bleeding, cooling Purges and discutient Topicals as before (Q. 17.) But if this Method does not succeed, an Incision must be made with a fine Lancet in the lower Part of the Cornea, at near the distance of the tenth of an Inch from the Albuginea, making the Opening sufficiently large to discharge the Matter, together with the aqueous Humour, (without wounding the Uvea) forced out by a gentle Pressure and Direction with the Fingers; and then the Eye may be dressed with a Compress dipped in a Solution of the Trochisci albi *Rhasis* in Rose-water, secured by Bandage as before (Q. 212.). This Operation may be likewise performed to discharge extravasated Blood, when it cannot be dispersed.

Q. 214. How do you treat *Deafness* and Pain in the Ear?

A. The Treatment in this Disorder varies according to the Cause. In the first place, the Light of a Candle is to be directed into the bottom of the Ear by a convex Lens, and if Wax appears to be the Obstacle, it must be first mollified with a little Oil, and afterwards extracted by a convenient Instrument,

or

or else washed out by injecting warm Milk or Water (by a Syringe) in which a small quantity of *Venice Soap* has been dissolved. If any other foreign Body appears, it must be extracted by the Pliers or Hook. If the Meatus auditorius and Tympanum are inflamed so as to cause the Ear-ach, which is often very excruciating, it will be proper to blow in warm discutient Vapours by the Fumigator, *Tab. V. fig. 3.* or to syringe the Ear with a Solution of the *Trochisci albi Rhabdis* in warm Milk, decanted after it has stood a little while for the Ceruse to subside; and if these do not suffice, Blisters may be applied behind the Ears, a cooling Purge may be taken, and the Patient bled, &c. as in other Inflammations (*Q. 17.*)

Q. 215. What is the *Ozæna*, and how do you treat it?

A. The *Ozæna* is a foul and malignant Ulceration of the pituitary Membrane in the Nose, with or without a Caries of the adjacent Bones, discharging a foul Matter, and attended with a stinking Breath. If this happens in the Cavity of the upper Jaw over the grinding Teeth, it is termed an *Ozæna in antro.* In order to the Cure, Mercurials with

with a Decoction of the Woods must be given internally, while externally is used an Injection *ex aq. rosar. ℥viij merc. præcip. virid. gr. iij*, or a mixture of *aq. calc. cum merc. dulc.* or else by fumigating with Cinnabar, conducting the Fumes by a Pipe. But for the *Oxæna in antro*, one or more of the superior grinding Teeth are to be extracted, and an Opening made through the Socket with the Point of the Scissars, or some other Instrument into the Sinus, for discharging the Matter, and deterging the Parts with an Injection *ex tinct. myrrh. cum mel. rosar.* which being once injected into the Sinus, must be retained for some time there with a Tent in the Opening, which must not be suffered to close up till the *Antrum* is well cleansed and healed.

Q. 216. How do you remove *Polypus's* in the Nose?

A. These are fleshy Excreescences of the pituitary Membrane, of various forms and sizes, obstructing the Cavity of the Nostrils and Fauces, so as to deprave the Voice, Deglutition and Respiration; being sometimes cancerous, and extremely painful. The Cure will be more or less difficult, as the Excre-
scence

scence is mild and fleshy, scirrhus or cancerous; and as it is more or less extended, and easily accessible. The Cure is performed by Extirpation (either by Ligature or Abscision) with a Pair of Scissars of a convenient shape; or if by these means a dangerous Hæmorrhage is feared, it may be sometimes removed by Caustic. But the most common Method in Practice is to extract the Polypus by a Pair of Forceps, *Fig. 6. Tab. M.* with Apertures in their Extremities to take the better hold. With these Forceps the Polypus may be extracted by the Mouth, when it appears in the Fauces, while the Patient is inclined with his Head back as much as possible, that the Polypus may stretch itself, and come down into the Fauces by its own Weight: but if the Polypus is small and lies forward, the Forceps must be introduced by the Nostril, and the Excrescence that way extracted by the Roots, observing not to leave any Remains, if possible, to prevent a Return of the Disorder. The Remains may be best removed by Escharotics, conveyed to the Part by a Wax-candle or Probe, after they have been mixed with some Digestive, and spread, or else barely sprinkled upon a small doffel of Lint. If the Hæmorrhage should prove excessive,

cessive, a little *alcohol vini*, or *Eaton's Styp-tic*, applied with Lint will suppress it.

Q. 217. How do you perform the Operation for the Hare-Lip?

A. The Hare-Lip is thus called from its being divided in the middle, and exposing the Teeth, as in a Hare or Rabbit. When the Lip has a double Division like the Letter M, it is then termed a double Hare-Lip; but a single Division in the lower Lip not from the Birth, is termed a spurious Hare-Lip. The Operation consists in taking off the Skin from the Edges of the Fissure in an even Direction with a Pair of fine Scissars, having first divided the Frænulum of the Lip joining it to the upper Jaw and Gums, and then the raw Parts are to be applied and retained together by passing through them one, two, or three Needles, (*Tab. I. fig. T and V.*) according to the length of the division. The Needles are inserted at about the distance of two tenths of an inch, or two lines from each other, beginning with the uppermost next the Nose, and their extremities or ends come out of the Lip at about the same distance from the Fissure. The Needles thus entered, and the Blood dried up with a
P Sponge,

Sponge, there is next applied a waxed thread twisted round them like the figure 60, as in *Tab. C. fig. 8* and *9.* termed the twisted Suture. Thus the bleeding Lips being retained together, and the ends of the Needles cut off, or prevented from doing injury by a bit of Sponge or Emplaster laid under them; there may be next applied a Pledget of Lint dipped in *mel rosarum*, internally betwixt the Lip and Teeth; or omitting this, I use only a like Pledget dipped in *Fryer's Balsam* applied externally, over that some dry Lint, and a Compress, secured by the Sling with four Heads, as in *Tab. S. fig. 5.* Thus the Dressings are to be left until the third, fourth or fifth day after the Operation, when, if the Lips appear conjoined, the middle Needle may be extracted, or the upper one when there are two; continuing to dress with some vulnerary Balsam, until the Lips being conjoined, in about a fortnight's time, the threads are to be cut, the pins extracted, and the Cure is compleated, as in other superficial Wounds.

Q. 218. How do you treat a *Cancer* of the Lip?

A. The

A. The Nature of this may be understood from what was said before of Cancers (Q. 41, & seq.) If it does not yield to internal Medicines with Mercurials, but becomes more malignant, I extirpate the cancerous Part by Incision with a Lancet, observing rather to take some of the sound Parts, than to leave the least bit of the Cancer remaining; after which the rest of the Cure may be performed as in the Hair-Lip.

Q. 219. How do you treat a Cancer of the Tongue?

A. This may be the Consequence of an Inflammation and Scirrhus, induced by the Irritation of some sharp Fragments of a Tooth, or from an internal Disorder of the Humours likewise; and therefore, in order to a Cure, the Asperities of the Teeth are to be removed by a Rasp or File, *Tab. 1. fig. C.* or by pulling them out; and if the cancerous Tumor does not yield to the application of Fryer's or the Peruvian Balsam with internal Medicines, it must be extirpated as soon as possible, unless it be rendered impracticable by spreading itself through the Root of the Tongue. After the scirrhus or cancerous Part is extirpated, I dress with *mel rosar.* and
P 2 *bals.*

bals. Peruv. deterge with Myrrh, and heal with a Linctus of Oil of sweet Almonds with Loaf-sugar, keeping the Patient under a proper Regimen of Diet with internal Medicines.

Q. 220. When and how do you scarify the Tonfils?

A. When these Glands are so violently inflamed as to threaten Suffocation or a Gangrene, after repeated bleeding and the most powerful antiphlogistic Remedies are used without effect, it will be necessary to scarify them with the Instrument, *Tab. T. fig. 7.* or with the Lancet, first invested with a slip of Plaster within a little way of the Point, to prevent it from entering too deep; and if Cupping is at the same time outwardly used upon the Neck with suitable Gargles, the Tumor will probably be reduced, and Suffocation prevented without Bronchotomy, which may otherwise become absolutely necessary.

Q. 221. How do you open an Abscess in the Tonfils?

A. If the Inflammation is followed with a Suppuration in these Glands, I depress the Tongue with a Spathula, Spoon, or the Speculum

culum oris, *Tab. V. fig. 2.* and with one of the longest Lancets invested as before with a slip of Emplaster, to within a third or one fourth of an inch of the Point, I make an Incision in that part which bids fairest; after which, when the Matter is expressed, the parts may be gargled with Jelly of black Currants mixed with Juice of *Seville* Oranges, the Efficacy whereof has been frequently experienced in Tumors and Inflammations of these Parts.

Q. 222. When and how do you extirpate scirrhus Tonsils?

A. If these Glands are so much enlarged and indurated as to form an irresolvable Scirrhus, threatening worse Consequences and a Suffocation; I then proceed to remove them by Extirpation, rather with the Ligature than by Incision, because the former Method is commonly attended with a very profuse, or even sometimes a fatal Hæmorrhage. The best Method of applying the Ligature for this purpose seems to be that of Mr. *Chefelden*, namely, to perforate the bottom of the Tonsil by the Needle armed with a double strong thread, *Tab. V. fig. 1.*; and when the Ligature appears through the Gland, it may

be drawn up to the Mouth by a Hook, then divided and the Needle extracted, leaving the two threads still in the Gland with their four Extremities coming out at the Mouth. This done, each of the threads may be tied, so as to compress each of them one half of the Gland, the one above and the other below; the knots must be double, and the Ligature cut off pretty near them, by which means a separation will be made in two or three days if the Ligatures continue tight, otherwise the Operation must be repeated to make a greater Stricture.

Q. 223. How and when do you perform the Operation of Bronchotomy?

A. This is a sort of Paracentesis of the Wind-pipe, made to give a free Communication of the Air into the Lungs, when the Trachea or Larynx is compressed or obstructed in a Quinsey, to prevent Suffocation, or to inflate Air into the Lungs of a Person lately suffocated to recover him; but for want of more numerous Precedents, the Operation, though safe, is rarely performed. It consists in making a longitudinal Incision of about an inch in extent through the Integuments, and as much below the scutiform Cartilage; and
after

after freeing the Integuments and Muscles from the Wind-pipe, drying up the Blood with a sponge, and keeping the Parts asunder with the fingers, I make a small transverse Incision betwixt the cartilaginous Rings, and then introduce a silver or leaden Canula, not perfectly round but depressed, of near an inch in length, and furnished with a couple of rings like handles at the top, to prevent it from slipping in, and to secure it by a Ligature round the Neck. If the Canula is found too long, it may be shortened relatively by passing it through one or more Compresses of Emplaster perforated before it is introduced; besides which, it will be likewise proper to have a second Tube to fit within the former, that it may be taken out and cleansed occasionally, if it should be obstructed by mucus or moisture. Thus Suffocation may be prevented, till the Inflammation and Swelling can be removed by bleeding and proper Medicines; after which the Canula being removed the Parts will readily close, and the Wound heal in a few days time, only by dressing with *Fryer's Balsam*, or *Linimentum Arcei*, &c. Some adapt a triangular Bodkin to the Canula, and in-

P 4 introduce

roduce it like the Trocar without any previous Incision. See *Tab. V. fig. 11.*

Q. 224. How do you extirpate scirrhus or cancerous Breasts?

A. In this, as in other Amputations, I endeavour to preserve a good deal of the sound Integuments, by dividing them round higher than the bottom of the Incision, by which the Breast is removed; in order to which the diseased Breast must be elevated either by the single or double Fork, *Tab. P. fig. 3 and 5.* or else by passing two Needles transversely under its Basis, as in *Fig. 1. Tab. P.* and tying the threads all four together in a knot, as in *Fig. 2.* After the Extirpation the larger Arteries are to be taken up or constricted with a Needle and thread, tying up some of the Flesh along with the Vessel; and the smaller may be compressed by applying a large doffel of dry Lint laid on unequally, thickest upon the Vessels, and retained by a pretty tight Bandage. See what has been said before of Cancers (Q. 41, & seq.) I next compleat the Dressing with a Compress, and a double-headed Roller of six ells long, and near a hand's breadth, applied with its middle under the sound Axilla A, *Tab. T. fig.*

fig. 1. and crossing the Roller-heads at B, they are carried obliquely across the Breast and Back to the other Axilla D, where being crossed again, and drawn tight upon the Compress and Dressings of the Breast E, F, are again carried up to B, and so repeated, till when the Bandage is near spent, you terminate it circularly round the Thorax on the Dressings in the Direction A, D.

Q. 225. When and how do you perform the *Paracentesis* of the Thorax?

A. This is an Opening made into the Thorax, usually betwixt the Ribs, to discharge some Matter contained in that Cavity, whether Blood in Wounds, purulent Matter in an Empyema, or extravasated Water in a Dropsy of the Thorax. Being first assured which side of the Thorax is most proper to be opened, from considering the Seat of the preceding Inflammation, from the Weight, Tumor and Fluctuation, and from the Patient's lying easiest on that side, I then proceed to make an Opening by Incision, first through the Integuments, betwixt the second and third of the lower false Ribs, about four fingers breadth beneath the lower angle of the Scapula, and as much from the Spine, obser-

observing that the Point falls upon the Interval betwixt the Ribs. The Place being thus determined, and marked with Ink, and the Patient's Body inclined a little backward to relax the Skin, I then take up the Integuments with the latissimus dorsi Muscle, and divide them all together by a longitudinal Incision of three or four finger's breadth. This done, I order the Patient to lean towards the sound side, that the Ribs may be drawn from each other so as to stretch the intercostal Muscles, which I next divide, together with the Pleura, by a crooked Scalpel, with the Point secured by the end of the finger; and with great caution I make a small Opening first, to avoid wounding the Lungs, if they should adhere to the Pleura; which if they do not, the Air entering will cause them to collapse, and put them out of danger, so that the Wound may be easily enlarged by the obtuse-pointed Scalpel, *Tab. I. fig. A.* guided with the edge downward, to avoid injuring the intercostal Vessels. If the Lungs adhere, I endeavour to separate them gently from the Pleura with my finger, or by forcing in some Liquor by Injection, or rather included in a Bladder, according to the Advice of *Hippocrates*.^{*} But if the Adhesion

^{*} De Morb. Lib. II. cap. 23.

is beyond the Extent of these Artifices, the Operation will indeed be useless, though no Reflection can be justly cast upon the Operator. The Opening thus made, I promote the Discharge of the contained Liquor, by ordering the Patient to cough, disposing his Body in a proper Posture, by throwing in some deterging Injection, and by extracting, if necessary, with a Syringe and Pipe, represented in *Tab. F. fig. 1* and *6*. I then keep open the Wound as long as the Discharge seems necessary; which if large, the first time the Patient must be treated with Cordials, and a proper Compressure upon the Abdomen, to supply the Tone of the Diaphragm lost by the incumbent Weight of the Fluid.

Q. 226. When and how do you trepan the Sternum?

A. We know from Anatomy, that there is an Interstice filled with the cellular Membrane betwixt the Duplicatures of the Mediastinum immediately under the Sternum, in which if an Abscess be formed from a Blow, Fracture or Inflammation, I then make an Opening betwixt the lower Cartilages on the left side with a Scalpel, or by the Trepan in the lower Part of the Sternum where the Abscess seems to point, as was directed before

fore in trepanning the Skull (Q. 128.) to discharge the Matter, and heal the Parts by Injections, &c. The Dressings here, as in the last Opening of the Thorax, must be made with Lint, Emplaster, Compress, and the Napkin and scapulary Bandage, *Tab. S. fig. 9.*

Q. 227. When and how do you perform the *Paracentesis* of the Abdomen?

A. This is performed in that species of the Dropsy called *Ascites*; for if the Water be contained in the cellular Membrane, or in Hydatides, it cannot be thus evacuated; and even at best it only gives a respite to the disorder for a time. If then the Water appears to be extravasated by its Fluctuation and Sense to the Touch, and the Urgency of the Symptoms renders the Operation necessary, the Patient being seated conveniently in a Chair, must press both his hands upon the upper part of the Abdomen, and then having oiled the Trochar, I stab it suddenly through the Integuments, without danger of wounding the Intestines, which are removed to a considerable distance from the Peritonæum by the included Water. The Part most convenient for this, is about three fingers breadth below the Navel on the left side of the Abdomen;

domen; but sometimes when the Navel protuberates, it may be punctured by the Lancet, and the Waters that way discharged without danger of a Rupture following. If the end of the Canula is obstructed by a part of the Intestine or Omentum during the discharge of the Water, I clear it by the Probe, observing to keep a due pressure upon the Abdomen by the hands of an Assistant, as the Water is discharged, lest the Patient should faint; and for the same purpose the like Compressure must be continued after the Operation, by rolling the Abdomen tight, after a Flannel has been applied dipped in spirit of Wine, so as to keep the Intestines up against the Diaphragm for three or four days, till the Parts have recovered their due tone. The Dressing may be made with dry Lint, and a Plaster that will adhere firmly. Thus the Patient's Life may be protracted for many years free from uneasiness, though the Disorder, it must be confessed, is very rarely thus cured. By continuing a Pressure upon the Abdomen, we are enabled to draw off the whole quantity of Water at once, which formerly they did not attempt for fear of the Patient's fainting. I once knew an astringent Injection with diluted Spirit of Wine

Wine injected after the Operation with success, the Patient afterwards recovering; and this Practice seems advisable whenever the Dropsy arises from a Rupture, or too great a Dilatation of the Lymphatics, as the exhaling Vessels will by that means be contracted.

Q. 228. How do you define and distinguish Ruptures?

A. A true Rupture is a Tumor formed by a Dislocation and Interception of the Intestines or Omentum usually at the Navel, Inguen or Scrotum; and according to the Part where the Tumor is formed, and its particular Contents, it is variously denominated either an Exomphalos, Bubonocoele, Oscheocoele, &c. or Enterocoele, Epiblocele, Pneumatocoele, Hydrocele, &c. and these again compounded make the Enteromphalocoele, Epiplomphalocoele, &c. but the most common of these is the Bubonocoele, formed by a Prolapsion of the Intestine or Omentum through the Rings of the abdominal Muscles, either into the Groin or Scrotum. Though these are called Ruptures, yet the Peritonaeum is for the generality only dilated into a Sacculus, containing the Intestine or Omentum confined betwixt the Muscles or Tendons, where they are prolapsed.

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The term *Hernia* then in general denotes a Luxation or Dislocation of some of the soft Parts contained in the Abdomen; though 'tis commonly restrained to Ruptures dilating the Peritonæum. But it is evident the term Rupture conveys a false Idea, since the Peritonæum is only dilated and not broke, as indeed I never knew that it was. There are three places in the Peritonæum, where it is not defended by the abdominal Muscles; two at the Groins, where in Men the spermatic Vessels pass through in a Bundle, and in Women are transmitted the Ligamenta rotunda of the Uterus; and the third place is at the Navel. The Peritonæum lines the whole Cavity of the Abdomen on all sides, and receives the Viscera into its Folds or Duplications; but at the Loins, the Aorta and its Branches are placed under the Peritonæum; and therefore when the spermatic Vessels pass out through the abdominal Muscles, they do not perforate the Peritonæum, which is there only incumbent on them, and fastened to the Tendons of the Muscles, through which the spermatic Vessels descend: but in this place there is no Muscle to support the Peritonæum, only Fat, Vessels, and Skin, which afford little or no Resistance. Now when the

Perito-

Peritonæum is pressed outward by a more violent internal force than is usual, it does not break, nor even dilate, except in these Parts where there is the least resistance. When this Sacculus or Production of the Peritonæum reaches the Inguen, it is called a *Bubonocèle*; when it descends into the Scrotum, *Oscheocèle*. In the same places, namely, through the abdominal Rings, in Women there are Blood-vessels ascend from the Thighs to the Uterus, as there are in Men descending to the Testicles; and therefore the Peritonæum may in these places be distended in Women, as well as in Men. When there is a Tumor thus produced betwixt the Thigh and side of the Pudendum muliebre, it forms a *Bubonocèle*; when the Tumor descends into the adjacent Part of the Thigh itself, it is called *Hernia cruralis*; which has been sometimes known to descend even to the knee, where the Tumor being opened by an imprudent Surgeon for an Abscess of the Thigh, the Intestine has been perforated, and discharged its contained Fæces. But in this Sacculus, formed by a Dilatation of the Peritonæum, there is nothing contained but what it receives from the Cavity of the Abdomen, namely, 1. An elastic Matter or Flatus,

tus, whence the Disorder is denominated *Pneumatocele*; or, 2. The natural Moisture of the Abdomen condensed into the form of a watery Liquor without being absorbed, which makes the first Species of the *Hydrocele*, in which the Water is either capable of being returned into the Abdomen by lying down on the Back, or not. 3. The Omentum prolapsed, whence the Disorder is denominated *Epiplocele*. 4. The Intestines prolapsed, whence the *Enterocoele*. All these prolapsed Parts in a Hernia never touch the spermatic Vessels, but descend near them in a Sacculus of the Peritonæum, while the Vessels themselves remain free, except from a Compressure by the hernial Tumor; for the spermatic Vessels take their course through the cellular Membrane, which likewise encompasses the prolapsed Intestines. When this Disorder has been of long standing, the hernial Sacculus commonly adheres to the adjacent Parts, and can never be returned. The Cure consists in preventing the Intestines from descending into the Sacculus, which is performed by Compression long continued, with a suitable Truss; whence the Membranes of the Sacculus grow together, so as to cure the Disorder radically.—But although

Q generally

generally speaking the Peritonæum is usually dilated only at the places before-mentioned, namely, at the Navel or Groins; yet if there should be a Weakness, or less Resistance in some other part of it, from a Wound or any other Cause, it may dilate there, and insinuate betwixt the abdominal Muscles together with the Intestines or Omentum; and then the Disorder is termed a *Ventral Hernia*: and this Rupture may be justly suspected, when the common Symptoms with a great Pain and Vomiting attend, while there is no appearance of the Tumor at the Navel, Scrotum, Inguen or Thigh; for if the very smallest part of the Intestine is intercepted betwixt the abdominal Muscles, it may suffice to produce the Symptoms, with even a Mortification and Death, if neglected. In this Case therefore a Dilatation must be made, and the Intestine returned, as in other Ruptures, preventing a Relapse by suitable Compression with the Bandage of *Tab. S. fig. 9.*—To these we may add some uncommon or anomalous Herniæ, particularly of the Bladder.—Herniæ of the Bladder were first described by *Ruyssch*^a in his chirurgical Observations, where he tells us of a Prolapsus of the Vagina together with the Bladder,

^a Obsl. Chirurg. 1 & 98.

so as to afford the appearance of a Prolapsus Uteri; till at length having opened the supposed Uterus through the Impertinencies of the tortured Patient, it was found to be the Bladder, from whence he extracted a great number of Stones, and afterwards cured the Patient. It is indeed much more difficult for the Bladder to prolapse in Men; yet there are some Instances of this, as may appear from the History given us by *Ruyfch.^b*, of a large Tumor formed in the Peritonæum and Scrotum, by violent straining in a Retention of the Urine, from an Obstruction of the Urethra; nor did the Urine discharge itself by the Catheter when introduced, unless when the Patient compressed the Scrotum with his hand; and again, the Urine ceased to flow as soon as that Compressure was discontinued. The Bladder in the Male is placed under a Production of the Peritonæum, at no great distance from the Groin, in which is the Seat of Ruptures. If now the Bladder is more than ordinarily full by retaining the Urine too long; and if at the same time there is a Cavity, or less Resistance to it in that part where is the Seat of Ruptures, then by straining to discharge the Urine, the over-distended Bladder dilates in that part into a

^b *Ib.* Obs. 98.

Sacculus without the Peritonæum, and descends in that part where the feminal Vessels descend into that Sacculus, where the Intestines usually prolapse; nor is it difficult to understand, that the Bladder, being pressed on all sides, will yield in that part where only it is not resisted.

Q. 229. How do you treat the *Hernia inguinalis*?

A. The Operation consists in returning the prolapsed Intestine or Omentum again into the Abdomen from the Inguen or Scrotum, either by the Fingers or with Incision, and keeping them there by the application of a convenient Truss or Bolster. If the Intestine has lately prolapsed, and neither adheres, nor is too much strangled or compressed by the Stricture of the abdominal Ring, so as not to make it tumefied or inflamed, it may for the most part be easily returned by the Fingers, and may be easily prevented from subsiding again by a Truss; but if the Omentum is likewise prolapsed together with the Intestine, as it cannot be so easily returned as the former, it may be left in the Scrotum, which must be constantly supported by a Bag-truss, and by filling up the space will prevent

prevent the Intestine from subsiding again. But if as it often happens, the Intestine constricted by the Rings of the abdominal Muscles is so much inflamed and swelled, as to prevent its return into the Abdomen by the Fingers, the Passage must be immediately dilated by Incision to prevent a Mortification, which otherwise happens in a little time; and indeed the Patient will seldom submit to the Knife, before the Gangrene is too far advanced to recover the Intestine to its natural and sound State, which is commonly a mortal Case; though we have often Instances of the gangrenous Part separating, and the End of the Intestine afterwards adhering to the Wound, forms an artificial Anus. The Reduction then must be first immediately attempted with the fingers, assisted with plentiful Bleeding, Clysters and Fomentations, or a Cataplasm of Oatmeal, Vinegar and Oil; or if the confined Flatus will not suffer the Intestine to return by these Means, it may be let out by puncturing with a tubulated Needle. But if the Symptoms increase, and all these Means prove insufficient, I immediately begin an Incision above the Rings of the Muscles, and continue it downward thro' the Membrana adiposa for about a hand's

breadth, and then free the cellular Membrane from the Peritonæum, which is next divided carefully, to avoid injuring the Intestine, which is commonly secured by a small quantity of a ferous Liquor. If Part of the Omentum is prolapsed and mortified, it must be cut off before it is returned, and then the abdominal Rings must be laid open by Incision, either by the obtuse-pointed Scalpel, *Tab. I. fig. 1.* or by dividing with the Probe-Scissors, and keeping down the Intestines from being injured by pressing with the finger, and continuing the Incision about an inch upward, more or less, as may be found necessary; then the Intestine being returned, the Lips of the Wound are to be brought and held together by two or three stitches thro' the skin only with the interrupted Suture; and the Patient must constantly lie on his Back in the Bed till the Wound is healed, as we directed in other Wounds (*Q. 145, & seq.*) But if the Intestine adheres to the Peritonæum, and the Peritonæum to the Tunica vaginalis and spermatic Vessels, it proves exceeding troublesome to free them, as may be seen in the Case given us by Mr. *Claudius Amyand*, *Phil. Trans.* N^o 443. Thus the Omentum or Epiplocele is also to be reduced;

ced; and the Operation for the Bubonocèle in Women is performed in the same manner.

Q. 230. What do you understand by the *crural Rupture*?

A. This happens to either Sex, but more especially to Women, from a Prolapsion of the Intestine, Omentum, or both, through the Arch in the Os pubis, and under the Ligamentum Poupartii to the inside of the Thigh by the Tendons of the psoas and iliacas internal Muscles, which together with the iliac Vessels pass out of the Abdomen thro' the same Arch. Here the Reduction must be made as before, and by dividing the Ligament instead of the abdominal Rings, conducting every thing else as in the Bubonocèle.

Q. 231. What is Nature and Treatment of an *Exomphalos*?

A. This is a Tumor formed at the Navel by a Protrusion of the Intestines or Omentum, caused by some Violence, Straining, Coughing, or difficult Labour in Women, and frequently for want of tying the Navel sufficiently close or near to the Abdomen in Children. Nor is this kind of Rupture so

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dangerous

dangerous as the others, either in Infants or Adults, unless it be neglected. The Reduction must be made, if possible, by the Fingers; otherwise an Incision must be made above the Tumor on the side of the Navel, and the Ring dilated by the Knife assisted with the Finger, as in the Bubonocoele. After the Intestine or Omentum is returned, the Integuments may be stitched together, and when the Wound is healed, a Compress or Truss should be wore for some time, till the Parts have acquired their due firmness. If the Intestine is intercepted betwixt some of the Interstices of the abdominal Muscles in other Parts, it is usually termed a *ventral Hernia*, which if not reducible by the Fingers will require the Operation as before; and in all these Cases it will be necessary to wear a Truss, till the Cicatrix is become sufficiently firm, *Tab. S. fig. 9.*

Q. 232. How many Kinds of spurious Ruptures do you make?

A. A spurious Rupture is any Tumor of the Scrotum, in which there is no Prolapsion of the Intestine or Omentum, being formed either by watery Humours, a Scirrhusity of the Testicle, or an Enlargement of the spermatic

matic Vessels; according to which the Tumor is denominated either an Hydrocele, Sarcocoele or Cirsocele, the last being also termed *Hernia varicosa* or *humoralis*.

Q. 233. What is the Nature and Treatment of the *Hydrocele*?

A. This is a dropfical Tumor of the Scrotum, in which the Water is either confined within the cellular Membrane, or extravasated in the Tunica vaginalis, being easily distinguishable from each other by the Touch. If the Disorder is local, or confined to this Part only, it will be convenient to discharge the Water by an Incision continued to the length of two or three inches on each side the Scrotum into the cellular Membrane; otherwise if the Distension is not great, and the Disorder an universal Anasarca, it may be as convenient to scarify the Legs, and make a Drain for the Water that way. But even when the Water is collected in the Tunica vaginalis, when accumulated to so great a quantity as to be very troublesome, it may be better discharged by making a Paracentesis with the Lancet than by the Trochar, dividing the Scrotum in its lower Part, and not with too long a Lancet for fear of wounding the

the Testicle. But after all, it must be confessed that this Operation is better let alone, if the Disorder can be removed by proper external and internal Remedies, since a Gangrene too frequently follows in the Scrotum after the Tunica vaginalis has been exposed to the Air.

Q. 234. What is the Nature of the *Sarcocoele*, and the Method of castrating?

A. A *Sarcocoele* is an Induration and Enlargement of the Testicle, frequently turning to a perfect Scirrhus, and sometimes degenerating into a cancerous Disposition, with an Ulceration and most acute Pains. If the *Sarcocoele* is recent, or not too much indurated, it may be brought to Suppuration by the application of warm Cataplasms with the Gums, assisted with Mercurials and a Decoction of the Woods internally. But it would be improper to attempt to bring the Testicle to Suppuration, when it is only inflamed from an Obstruction of the Vas deferens, whence the Epididymis becomes greatly tumefied, because that may be dispersed by bleeding, purging, gently compressing the Epididymis, and suspending the Testicle with a Sling; or if it turns to a Scirrhus, there is no danger
of

of its becoming cancerous, as it would if in the Body of the Testicle itself. If then the Testicle itself appears from its Size and Pain to incline towards a Cancer, the Disorder not having extended through the spermatic Cord above the Rings of the abdominal Muscles; there then remains but one Remedy, and that is to extirpate or castrate the diseased Testicle by the Scalpel. But if the spermatic Cord is enlarged or varicose within the Abdomen, the Patient having a Pain in his Back or Loins, even when the Weight of the Testicle is supported by a Sling, in that Case the Operation will be useless, and therefore must not be undertaken. In order to perform it, the Patient being secured, I begin an Incision with the Scalpel above the Rings of the abdominal Muscles, and continue it through the adipose Membrane downward in proportion to the Size of the Testicle, which being freed from the Scrotum, after making a Ligature upon the spermatic Cord a little below the abdominal Rings, it may then be cut off together with a good deal of the superfluous part of the Scrotum, taking care to secure the larger Vessels by Ligature, if there is danger of a profuse Hæmorrhage. *Le Dran* indeed advises to make the Ligature only

only upon the spermatic Artery and Vein; and asks for what reason the Ligature is made upon the Vas deferens and spermatic Nerves; since we know a Stricture upon such Parts excites great Pain and Inflammation. Others again are afraid of cutting through the Blood-vessels, when the Ligature is made upon them only; and therefore it is advisable to make two Ligatures, one half an inch lower than the other, upon the spermatic Artery and Vein without the Nerves or Vas deferens, only securing the Blood-vessels from being cut through with the Ligature by the Interposition of some soft Lint, constringing the Ligature, and securing it by the Surgeon's Knot, in which the thread is passed twice through the Loop; this done, the Testicle may be cut off a little below the second Ligature. Yet it must be owned, that in common Practice, Convulsions hardly ever follow from making the Ligature upon the whole spermatic Cord; and the Nerve is also interwove in such a manner with the Vessels, as to render it very difficult, if at all practicable, to free it from them.

Q. 235. What is the Nature and Treatment of a *Phymosis*?

A. A Phy-

A. A Phymosis is such a Stricture of the Prepuce over the Glans Penis, that it cannot be denudated or drawn back, which confining Shankers and virulent Matter renders it necessary to be cut open in the venereal Disease. If then discutient Fomentations or Cataplasms will not remove the Stricture, the Prepuce is to be extended forward, while the Glans is pressed back, and then divided laterally either by the Scissars or Scalpel, slitting up to the very extremity at the neck of the Glans; after which a pretty copious Hæmorrhage usually ensues, and should not be suppressed, as it may serve to reduce the Inflammation and Tumor: but if this Hæmorrhage is much feared from the Weakness of the Patient, or other Circumstances, the Incision is better made with the Scalpel on one side of the Prepuce, rather than above where the Vessels are very large. If the Stricture has caused an incipient Gangrene in the Glans, I scarify to the quick, and apply an Infusion of *theriaca in S. V. camph.*

Q. 236. What is the Nature and Treatment of a *Periphymosis*?

A. This being the Reverse of the former, is when the Prepuce turns back behind the Glans,

Glans, so that it cannot be brought forwards to cover the Glans. Some indeed have the Prepuce naturally turned back in this manner without any inconvenience; but when the Stricture hence arising is so great, as to obstruct the Circulation in the Glans, and threaten a Gangrene, several small Incisions must be made by the Lancet in the Stricture longitudinally, as must be also done when the Prepuce is distended with watery Tumors called *Crystallines*; and then the Dressing may be concluded by fomenting with Discutients, as an Infusion of *theriacæ in S. V. camph.*

Q. 237. How do you remove venereal Warts from the Prepuce and Glans?

A. These are commonly a sort of fungous Flesh of very speedy Growth, and may be easily taken down by mild Escharotics, as *alum. ust. merc. præcip. rub. &c.* mixed with a little digestive Ointment; or if they hang by a small Neck, they may be taken off by the Scalpel.

Q. 238. How do you remove a Mortification in the Penis?

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A. This is best done by introducing a silver Canula into the Urethra, then making a strict Ligature with thread or silk upon the sound part of the Penis immediately behind that which is sphacelated, so as to compress the same close to the Canula, keeping the Ligature tight till the mortified Part separates from the rest.

Q. 239. How do you treat an Incontinency of Urine in Males?

A. As this often proceeds from Weakness in old Age, a Palsy or Stone in the Bladder, incapable of Relief from internal Medicines, Surgeons have therefore contrived a small Instrument with a Screw, called the *Yoke*, to compress the Urethra near the Neck of the Bladder, represented in *Tab. III. fig. 7.* which being lined with Velvet may be taken off and re-applied as there is occasion, so as to make it sit easily upon the Part.

Q. 240. What are the Signs of the Stone in the Bladder?

A. They are (1.) A frequent Inclination to make water, followed with great Pain in the Glans, lasting two or three minutes, and sometimes a Suppression of Urine. (2.) A Tenef-

Tenesmus, or fruitless Attempt to go to stool from the Irritation of the Stone upon the Rectum. (3.) Frequent Discharges of Mucus in the Urine, and sometimes Blood, from the Irritation of the Stone upon the Coats of the Bladder itself. (4.) The Patient not being able to make water, but in a supine Posture, and frequently perceiving the Sense of a Weight or heavy Body moving in his Bladder, and itching in the Glans. But lastly, (5.) As these may be all fallacious, the only sure Sign is by searching with the Catheter, which affords the most certain Diagnosis by the Noise and Resistance to be perceived when it strikes against the Stone.

Q, 241. How do you search for the Stone?

A. The Patient being laid supine, I introduce the oiled Catheter, *Tab. Y. fig. 2.* into the Urethra with its convex Part towards the Abdomen, till I find the Extremity meet with some Resistance in the Peritonæum; and then suddenly turning it round without violence with the concave part towards the Abdomen, I thrust the end of it gently downward under the Os pubis, and then upward into the Bladder, raising the extremity by depressing the handle. But one not versed in

in the proper Method of turning the Catheter, may better introduce it all together from the first, with the concave side towards the Abdomen; and if the extremity hesitates at the entrance into the Bladder, it may be forwarded into it by directing it with the finger, first introduced into the Rectum. The Catheter must be chose in Size and Curvature agreeable to the Age of the Patient; but it may be much more easily introduced through the Urethra of the female Sex, which is much shorter, wider, and more direct. If the end of the Catheter in its course should meet with some Resistance from the Neck of the Bladder, or Caput gallinaginis, it must not be forced roughly forward, but rather drawn a little back, and urged on again through the middle of the Canal till it has entered the Bladder, when the End of it is to be directed towards every way, till its meeting with a hard sonorous Body discovers that there is a Stone, the Largeness, Roughness and Compactness of which may be judged of by feeling with the end of the Instrument.

Q. 242. How many ways are there of cutting for the Stone, and which do you prefer?

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A. The first and oldest Method described by *Celsus* is known by the Name of the *Apparatus minor* from the fewness of Instruments used in it; nothing more being required than to dip the middle finger in Oil, and introduce it into the Anus, while the right hand pressing above the Os pubis upon the Bladder, so as to bring the Stone to its Neck, an Incision is then made with a Knife (*Tab. I. fig. D.*) in the left side of the Perinæum upon the Stone, which is next turned out through the Wound either with the Finger or a Scoop. Thus the same Parts were divided as at present in the lateral Operation, only we now use convenient Instruments to direct the Incision, and extract the Stone.—The *Apparatus major*, published by *Marianus* in 1524, is performed with a grooved Catheter or Staff, (*Tab. V. fig. 3.*) oiled and introduced into the Bladder, and the convex or grooved Part being turned outwards pressing on the left side of the Seam in the Perinæum, an Incision is begun immediately below the Scrotum, and continued downwards to within an inch of the Anus, and then bringing the Point of the Knife forwards in the Groove, a good part of the Bulb of the Urethra is divided. Then the Gorget

(*Tab.*

(*Tab. V. fig. 6.*) is introduced, and after dilating the Urethra and Neck of the Bladder with the Forefinger, the Forceps (*Tab. V. fig. 10.*) are introduced shut till they touch the Stone, when they are opened to take hold of the Stone, and extracted with a moderate force downwards towards the Rectum. — The *high Operation* published by *Peter Francus* in 1561, after being discontinued from his time, was revived here at *London* in 1719 by *Mr. John Douglass*. After disposing the Patient, the Bladder is distended with ten or twelve ounces of Barley-water injected by a Catheter, the Penis being in the mean time pressed close when the Instrument is withdrawn, to prevent the Return of the Liquor; and then an Incision is made with a round-edged Knife, to the length of about four inches, between the Recti and pyramidal Muscles through the adipose Membrane to the Bladder; after this, an Incision is made into the Bladder itself with a crooked Scalpel, carried a little under the Os pubis, introducing the Fore-finger of the left Hand immediately while the Water is running out, in order to direct the Forceps to the Stone. But this Method soon lost its Reputation from the many bad Consequences

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which attend it; partly from wounding the Peritonæum, and injuring its Contents by the extravasated Urine, and partly from the Urine insinuating into the cellular Membrane, whence incurable Fistulæ, Excoriations, &c.

—The *lateral Operation*, which is that now commonly used, was first put in practice by *Fryer James* at *Paris* in 1697, and is at present performed with some Improvement by *Mr. Cheselden*, and most others in the following manner. The Patient being laid on a Table, with his Hands and Feet tied, and the Staff (*Tab. Y. fig. 3, 4.*) passed as in the old way, let your Assistant hold it a little slanting on one side, so that the Direction of it may run exactly through the middle of the left Erector Penis and Accelerator Urinæ Muscles; then make your Incision through the Skin and Fat very large, beginning on one side of the Seam in Perinæo, a little above the place wounded in the old way, and finishing a little below the Anus, between it and the Tuberosity of the Ischium. This Wound must be carried on deeper between the Muscles, till the Prostate can be felt, when searching for the Staff, and fixing it properly if it has slipped, you must turn the edge of the Knife upwards, and cut the whole

whole length of that Gland from within outwards, at the same time pushing down the Rectum with a finger or two of the left hand, by which Precautions the Gut will always escape wounding; after which the Operation finishes nearly in the same manner with the greater Apparatus; that is, by sliding the Gorget (*Tab. Y. fig. 3, 4.*) along the Groove of the Staff into the Bladder, and dilating the Parts with the Fore-finger, the Forceps (*Tab. Y. fig. 10.*) are introduced shut till they touch the Stone, which is then grasped by a moderate force, and extracted downward towards the Rectum. In this Method, the remarkable Parts wounded by the Knife are the Musculus transversalis Penis, Levator Ani, and prostate Gland. In the old way, the Urethra only is wounded about two inches on this side the Prostate; and the Instruments are forced through the rest of the Passage, which is composed of the bulbous part of the Urethra, the membranous part of the Urethra, the Neck of the Bladder and prostate Gland. The chief Cautions necessary are to avoid wounding the Rectum, and to restrain the Hæmorrhage by Ligature with Needle and thread, if any large Vessels are divided in the external Wound

before the Extraction of the Stone. If after the Operation the Vessels of the Prostate bleed, the Hæmorrhage may be suppressed by applying Lint dipped in *alcohol vini*, or some other styptic Liquor; or if there is no Hæmorrhage, a Pledget of dry Lint spread with some mild Digestive will suffice. If the Symptoms of a violent Inflammation ensue, and the Pains increase a few hours after the Operation, recourse must be had to bleeding, emollient Clysters, with a Fomentation applied externally in a Hog's Bladder, &c. If the Pulse is low, Blisters are often useful; the Dressings must be retained by a loose Bandage; and if the Wound is foul, it may be deterged by dressing with Lint dipped in Turpentine or its Oil made warm, in which has been dissolved some Verdigrease; and when the Lips of the Wound appear clean, they may be healed by dressing with some soft Digestive or dry Lint only, applied so as not to over-compress the growing Surface, which by such Pressure might be render'd callous. The Union of the Lips may be also much expedited by retaining them together by the twisted Suture (*Tab. C. fig. 8 and 9.*)

Q. 243. When and how do you perform the *Paracentesis* of the Bladder?

A. The *Paracentesis* or Puncture of the Bladder is made with a Trochar (*Tab. T. fig. 10.*) either immediately above the Os pubis betwixt the pyramidal Muscles, or in that part of the Perinæum which is cut in the lateral Operation for the Stone, in order to discharge the Urine when it cannot be drawn off by the Catheter, the Patient's Life being in the utmost danger. For it may be impossible to pass the Catheter, either from the violent Inflammation, Cicatrix, Tubercle, Stricture, or Scirrhusity, or even a Stone wedged into the Neck of the Bladder. There is no great danger of wounding the other side of the Bladder in this Case with the Point of the Trochar, the Distension of it being so very great; but of the two, the *Paracentesis* of the Bladder above the Os pubis is the easiest, and appears from Practice to be the safest Method, except in some Cases, as when a Callus, Scirrhus, or large Stone stops up the Neck of the Bladder, then it would be better to make the Puncture in Perinæo, because then the Opening may be afterwards dilated either by the Knife or Sponge-tents, as may be found necessary, so as to remove

the Obstacle. If a callous Fistula remains in Perinæo from this or any other Cause, in order to cure it, the Callosity must be first removed from the Wound either by the Scalpel or escharotic Medicines, as the application of Blister-Plasters, white or red Precipitate, with *linimentum Arcei*, &c. taking care to preserve the Lips together when deterged either by Suture or Compress, and to prevent the Urine from passing through them, by giving it a free Vent through a flexible Catheter left in the Bladder and Urethra, which Method has happily succeeded in several Instances.

Q. 244. How do you extract a Calculus in the Urethra?

A. In this deplorable Case, if the Stone is not over-large, one may endeavour first to remove it by injecting Oil into the Urethra, and afterwards by inflating it with a Blow-pipe as much as possible, pushing the Calculus forward with the fingers; but if the Stone is so large, rough, and seated so near to the Neck of the Bladder, that one cannot reasonably expect this Method to succeed, the best way is to make an Incision through the Urethra upon the Stone, sufficient to give

it

It a Passage outward, making the Incision laterally in the Urethra; and if a silver Tube, made in the manner of a flexible Catheter, is afterwards introduced and left in the Urethra, so as to discharge the Urine without suffering it to penetrate the wounded Parts, the Cure will be much expedited, provided Inflammation is guarded against, and the Wound may heal in twenty-four hours. If the Incision be made in the upper part of the Urethra, after freeing it as much as possible from the Corpus cavernosum Penis, when the Stone is extracted, the Orifice will be compressed by the Corpus cavernosum, and much sooner healed.

Q. 245. How do you extract the Stone in Women?

A. The Urethra is so short, and capable of so great Dilatation in the female Sex, that there is hardly ever any occasion to cut them for extracting the Stone, insomuch that we have many Instances of Stones discharged without cutting, which have even equalled the size of Hen and Geese Eggs. They are to be placed as in cutting for the Stone, and after introducing a strait Director into the Bladder through the Urethra, a Gorget is trans-

transmitted through the Director, and thro' the Gorget is conveyed a pair of Forceps to extract the Stone, which may be done without cutting, except when it is extremely large; in which Case it is more advisable to make an Incision laterally on each side the Urethra, without injuring the Vagina, rather than to force a Laceration of it. Sometimes if the Stone is of a soft Texture, it may be first broke by the Forceps, and extracted in Fragments, when it is too large to be taken out entire. But as an incurable Incontinency of the Urine frequently attends this Method of extracting the Stone, some prefer the making an Incision through the upper part of the Vagina into the Bladder, extracting the Stone that way; and thus *Hildamus* succeeded, *Cent. 1. Obs. 68. Cent. 3. Obs. 69.*

Q. 246. How do you treat a *Prolapsus Uteri*, or bearing down of the Womb and Vagina?

A. When the Os tincæ subsides a considerable way into the Vagina, it is called a bearing down of the Uterus; but if it appears externally out of the Vagina, it is termed a *Prolapsus Uteri*, and may frequently happen from a Relaxation and difficult Labours.

Whether

Whether the Uterus be prolapsed or inverted, if it be not timely reduced into its proper Situation, it soon becomes either gangrenous or cancerous from the Stricture, or from the cold Air: it should therefore be returned as soon as possible, after being fomented or treated with dry aromatic Fumes; and when reduced, it must be sustained by a Pessory made of Cork cut in the shape of a Ring, and covered over with Wax, and of such a size as will not permit it to subside, being almost twice the Diameter of the Vagina. Afterwards dry Fumes of Amber, Benjamin, Mastic, &c. may be conveyed by a Funnel, or a corroborating Injection may be used of *aq. calc. & S. V. p. r. e.*; to which may be added as much Smith's Forge-water, &c. provided there is no disposition to a cancerous Disorder. An Infusion of Granate-peels or Oak-bark in some Chalybeat Water may be also used as an Injection, and the *Peruvian* Bark may be given internally; and the same Means will be likewise effectual in a Prolapsus of the Vagina.

Q. 247. How do you treat a Prolapsus Ani? A. The

A. The Rectum is frequently relaxed and swelled so much with the Piles after difficult Labours or Costiveness, &c. as to appear inverted outward, sometimes near three or four Inches; and in this Case it ought to be immediately returned after fomenting it with warm red Wine, and its Relapse must be prevented by the application of thick Compresses retained by the T Bandage. It may be likewise convenient to convey the dry Fumes before-mentioned for the Prolapsus Uteri through a Funnel into the Anus; upon which may be sprinkled likewise some fine Powder of Starch, with a little *Japan* Earth and Dragon's Blood. But if it proceeds from an Inflammation, this Powder will be better omitted, and the Disorder should be rather treated by Bleeding, Abstinence, and cooling Medicines.

Q. 248. How do you treat the bleeding and the blind Piles, with other Tubercles of the Anus?

A. The Piles we know are Tubercles of the Anus, of various Sizes, like Peas, Grapes, Walnuts or Eggs, formed by a Distension of the hamorrhoidal Vessels with Blood, appearing of a livid Colour, and extremely painful;

painful; and these are called the blind Piles; but if they break and discharge Blood, they are termed the bleeding Piles, frequently appearing in plethoric and costive People, especially in Women with Child. The blind Piles, which are very large and painful, may be removed by Ligature, which will cause them to separate in three or four days time; the Inflammation may be taken off with *ung. nutrit.* after having first applied Leaches to the most turgid Veins, or else opened them by the Lancet, compleating the dressing with some Lint, Compresses, and the T Bandage. In the mean time the Patient should be bled in the Arm, and treated with a Decoction of the *Chelidonium minus*, or *Scrophularia minor* internally, and a Cataplasm of the Herb externally. In the bleeding Piles, if the Hæmorrhage is not profuse, it ought rather to be encouraged than suppressed; but if the Patient's Weakness or Habit requires, it may be restrained by making Ligatures upon the most considerable with a Needle and thread, cutting off the superfluous Parts, and the application of *alcohol vini* as a Stiptic. In the same manner likewise may be removed other Excrescences of the Anus, whether under the Denomination of *Condyloma*, *Crista*, *Ficus* or *Fungus*.

Q. 249. What is the Nature and Treatment of *Fistula* in the *Anus*?

A. *Fistulae*, whether in the *Anus* or any other Part, are callous Ulcers, as we before observed, generally proceeding from an Abscess; but both Abscesses and Ulcers without Callosity, when seated in this Part, are termed *Fistulae*. These *Fistulae* are of three kinds; some are critical Abscesses formed in the Fat which invests the Rectum; others proceed from the Piles ulcerating, and others again arise from venereal Causes; but from whatever Cause the *Fistula* proceeds, it must be laid open externally as much as possible throughout its whole Extent, either by the Scissars or Scalpel; or if the *Fistula* runs up by the side of the Intestine, the Gut must be slit up the whole Extent of the Sinus, whether that perforates the Intestine or not, that an opportunity may be given for the application of proper Remedies to the very Fundus of the *Fistula*. But it will not be barely sufficient to lay the *Fistula* open into the Gut when there is a considerable Callosity, but it will be likewise necessary to cut off all the callous Parts as much as possible, which is much better than to keep the Patient in continual Pain by the use of Eschiarotics. If

the Sinus's are too small to admit the Legs of the Scissars, they must be first dilated with Sponge-tents; nor is there occasion for any other Instrument except the Knife and Director, which of the two cuts easier than the Scissars, if it were but as easy to be managed; nor is there any occasion to be afraid of dividing the Sphincter of the Rectum, as some have imagined, since daily Experience assures us it may be done without any consequent Palsy, or Incontinency of the Fæces. The Abscess or Fistula in Perinaeo spreading towards the Anus, commonly proceeds from a Gonorrhæa affecting the prostatic Gland first, but frequently extends with Sinus's both into the Rectum and Bladder itself. Here also, as before, the callous Parts must be cut out, and the Cure forwarded by a slight spitting, or at least with a proper use of Mercurials both externally and internally; and when the Malignity is removed, and the Parts properly deterged, the rest of the Cure may be conducted as in other Abscesses. In all Fistulae of these Parts one ought to be particularly careful not to neglect the use of Mercurials, when they proceed from a venereal Cause, without which little good can be done. The Dressings may be made with

dossils of Lint spread with digestive Ointment, and secured with threads, but not pressed in so tight as to render the Parts callous; and these are to be retained by Compress and the T Bandage of *Heliodorus*, which consists of two pieces of Linen sewed together in the shape of a T, the one being fastened round the Waist, and the other brought up betwixt the Legs over the Dressings, which will be kept the tighter upon the Parts, if the T Bandage is assisted by a Scapulary fastened to it before and behind, as in *Tab. S. fig. 9.*

Q. 250. What do you apprehend to be the Nature of the venereal Infection, and how do you distinguish the Diseases arising from it?

A. As it seems impracticable to discover the Nature of this *Virus à priori* from the mechanical Figure, Texture, and Combination of its Particles, with the relation they bear to the Parts of the Animal, Solids and Fluids, (in the same manner as we are unable thus to discover the Nature of the variculous Contagion, or that from the Bite of mad Animals); therefore in these difficult Cases we can only determine the Nature of the Poison *à posteriori*, from its Effects, which appear

appear in the solid and fluid Parts of the animal Body by Experiment or Observation. As the Fluids have a less Cohesion, and are more easily affected than the Solids, therefore the first Action of this, as well as of the variolous and hydrophobous Contagion, seems to be primarily upon the Fluids, and particularly those which are the most viscid, and have the least progressive Motion in the Body; namely, the Fat, the Lymph, and mucous or sebaceous Juices of the Glands: for as the variolous Matter produces various Disorders by its greater Activity upon that Fluid which moves the fastest in the Body, namely, the red Blood, either by vitiating the Texture of that Fluid, or irritating the Vessels through which it is moved; this venereal Virus, on the contrary, being more sluggish, is disposed only to operate upon those Fluids, whose slow Motion and Tenacity of Parts will not only embarrass or confine, but also give the Contagion an Opportunity to act as a Ferment, by dissolving and combining the natural and healthy Texture, of the Juices first, and then of the Solids, by means of those Juices. It is not necessary for us to enquire into the Manner how it first acts in vitiating the Fluids, but it is sufficient to di-

rect us to the proper Method of Cure, if we are acquainted with its primary Effects which it produces obvious to the Senses. But if we may be allowed to give our Opinion, as the Matter of this, as well as of the variolous and hydrophobous Contagion is of animal Original, they seem to produce their Effects by an Evolution and new Modification of the saline Parts in the animal Fluids, which having the greatest Power of Attraction, exert the greatest Force in producing similar Changes: but the Size, Figure, and particular Nature of these Salts in the several Poisons before-mentioned, seem to be in each of them *sui generis*, of a particular Nature, and not reducible to any known Class. Astruc indeed thinks the Nature of these Salts to be acid, because their immediate Effects are an Inspissation and Obstruction of the Fluids, &c. but it may as well produce those Effects, as a neutral or alkaline Salt particularly modified; which seems the more probable, if we consider that all Acids are either of mineral or vegetable Origin, and the most remote from animal Nature. The variolous Poison indeed is subtle enough to be communicated by Effluvia; but the venereal Contagion is of so gross a Nature, that it requires
an

an immediate Contact to mix its Parts with the Fluids, and vitiate their Texture. Whenever then a Particle of this Contagion is communicated from the Body of an infected Person to one that is sound, either by Contact of the Parts of Generation, by sucking, kissing, or mixing their Saliva, or any other way, it begins first to shew its Effects upon the Part to which it is communicated sooner or later, according to the different Nature of the Part and its Juices, with the Strength or Quantity of the Contagion itself, and the Patient's Habit and Course of Life. Here, that is, in the Part, by Inspissation of the Fluids, and inducing an Acrimony similar to that of itself, the Infection first appears by a slight Inflammation, which by degrees ulcerates, spreads, and affords a particular kind of Matter, of a greenish yellow Colour, proving inflexible to the common Medicines used in other Ulcerations.

Venereal Diseases may be therefore distinguished into topical, where the Matter being lately received, is as yet only confined to the Part primarily affected; and universal or confirmed, where the Matter has spread throughout the whole, or the greatest Part of the Habit in general. Hence it appears,

that the Disease may be defined in general a contagious Inflammation and Ulceration of a particular Kind, either throughout the whole Habit, or in some particular Part; confined to those Juices which have the least Motion, namely, the Fat, lymphatic, glandulous and mucous Juices. And hence we are naturally led to treat the Disorder as an Inflammation at first; but afterwards to have a particular Regard to the Virus or Contagion to be expelled from the Habit, or Part itself affected. However, it has been customary to term the Disorder a Pox, whenever it appears in any other Part but the Urethra; in which last Case, namely, as long as the Disorder continues confined to the Urethra, it is termed a Gonorrhœa or Clap.

Q. 251. What is the proper Nature, and how many Kinds are there of a virulent *Gonorrhœa* or *Clap*?

A. This, from what has been said before, appears to be an Inflammation and Ulceration in the Urethra, attended with a scalding of Urine, and more or less of a purulent Running. For the Membrane lining the internal Surface of the Urethra is nervous, very sensible, and replete with many small Blood-vessels;

vessels; among which are interspersed Lacunæ, or small Ducts, discharging a mucous Humour, and opening obliquely with their Orifices pointing outward from the Bladder towards the Perforation of the Glans. The first, largest, and most remarkable Set of these Lacunæ or mucous Ducts are seated a little behind the Glans; two of them being more considerable than the rest about the Frenulum: and this is the first Seat of the Gonorrhæa, when the contagious Matter being drawn up in a direct Course into these Lacunæ, at the time when the Parts grow flaccid, it is there embarrassed by the viscid Humour, which is thus by degrees corrupted into the same Nature with the first contagious Matter. As it becomes more acrimonious, it irritates and inflames this sensible Membrane, where acting as a Stimulus, it increases the Discharge of the mucilaginous Liquor from the Lacunæ outward into the Urethra, which in a natural State it lubricates and defends from the Acrimony of the Urine; but in this inflamed State the nervous Fibres are so stretched and denuded of their defending Mucus, that only the Acrimony of the Urine as it passes through, excites more or less in proportion an intolerable burn-

ing Pain. The Matter thus discharged from the Lacunæ by a Pressure continued from behind the Neck of the Glans forward, tho' at its first Secretion it was perfectly pellucid, does, by stagnating with the warmth of the Part and Action of the Virus, soon corrupt into a greasy sort of Matter of a greenish yellow Colour; whereas naturally, before the Mucus is thus corrupted, it is clear, ropy and viscid, drawing out into threads. Hence we have a Sign whereby to distinguish when the Virulency of the Matter is gone off; namely, when the Matter discharged begins to appear ropy and clear without a greenish purulent Colour; for then it denotes that the virulent Particles lodged in the Lacunæ are discharged by the Flux outward. Hence therefore this Flux is to be promoted for some time, and not stopped by astringent Injections; for if the Lacunæ are contracted by such Injections, and the Matter confined and repelled through the adjacent lymphatic Vessels, it will pass on by the serous Veins to the next adjacent lymphatic Glands, namely, those of the Groins (or else to the Testicle) where acting as before, it will excite an inflammatory Tumor, called a *Bubo*; or else producing Obstructions in the lymphatic Vessels

fels and cellular Membrane, which lie immediately under the Cuticle of the Glans and Prepuce, they will by degrees turn to small Ulcerations called *Shankers*. A Running ought therefore to be promoted for some time, in order to throw out the Matter received, and prevent it from spreading into other Parts.—The next or second Seat of the Gonorrhœa is higher up in the Urethra towards the Bulb in the cellular Membrane and Ducts of *Cowper's* Glands, which are ulcerated in the same manner as before; only here the Discharge is greater, the Inflammation and Symptoms more violent, and the Cure more difficult, as it is more out of the way of the Action of deterging and stimulating Injections, which are highly proper in these Cases not to stop up, but to cleanse and promote the Running by their gentle Stimulus.—The third and worst Species of a Gonorrhœa or Clap, is when the Matter takes place in the Ducts of the prostate Gland at the Neck of the Bladder, and Insertion of the Ducts of the seminal Vesicles, which being sometimes ulcerated and destroyed, leaves behind a true, simple, and incurable Gonorrhœa after the Patient is cured of the venereal Infection; and at last reduces him by the incessant Discharge,

till he perishes of a *Tabes dorsalis*, or *Marasmus* of the whole *Habit*. As this last Kind is the worst and most difficult to cure, so it luckily happens to be the least frequent in Practice. But both this and the second Species are frequently the Consequence of the first, the Matter spreading successively higher up into the Urethra through neglect of proper Remedies, or from repeated Coitions (frequently even with Women known to be infected) during the time of the *Gonorrhœa*. In the second Species, the small Glands dispersed along the Urethra, after being inflamed, turn scirrhouis, and leave those Knots or Indurations, which are as difficult to remove as they are frequently observed.

Q. 252. How do you treat a *Gonorrhœa* in order for its Cure?

A. From considering the Nature of the Disorder, we are directed to the following Intentions: 1. To discharge the Virulency, and prevent the spreading of the Contagion. 2. To abate or remove the Inflammation; and lastly, 3. To heal up the Ulceration. Therefore as the Disorder is here topical only, there is little or no occasion for internal Medicines, only to keep the Inflammation under

under by a cooling Purge with Salts and Manna or Rhubarb, bleeding when necessary in full Habits, and in the Summer-time, joined with Abstinence and a plentiful use of thin Liquors. Not that any thing of the Virus is carried off by purging, only it is necessary to give a Stimulus to the Bowels, that they may not have an opportunity of absorbing much of the crude Chyle, which being the grossest Fluid circulating in the Body, is the most apt to increase Obstruction and Inflammation not only here, but also in any other inflammatory Case. Therefore if the Patient can be enjoined to Abstinence and thin Liquors, there will be no occasion for Purges, which many injudiciously give so as to shock and waste the whole Habit by their great Strength and repeated Doses, more especially of Calomel; of which last there is not occasion to give so much as a single grain internally, or of any other Mercurial in the two first Species of the Gonorrhœa, which are always rather exasperated by internal Mercurials inflaming the Habit. But the most speedy, safe, and effectual Remedies in this Case, next to a cooling Regimen and Medicines, are repeated warm bathing of the Parts, with the use of deterging Injections first, and then of healing

healing ones. I have several times observed the Truth of what is justly affirmed by *Boerhaave*^a and *Hoffman*^b; namely, "that a Gonorrhœa or Shankers too soon dry'd up by Astringents before the Virus is run off end in a Pox, if the Case is inveterate, and the Inflammation neglected." And the latter observes, "that Shankers dry'd up before the venereal Virus is run off turn to a Gonorrhœa, and a Gonorrhœa too soon stopp'd turns to Bubo's; but Bubo's repell'd turn again to a Running, or a confirmed Lues." Mercury inflames, and is mischievous in the beginning of Claps, as it is no Specific to the Virus, but removes its Effects by dissolving the Tenacity of the Fluids, and by evacuating them with the Virus; but then this last must be understood of the confirmed Lues, or where there are Shankers, Bubo's, Scabies, &c.

The deterging Injections I have frequently known to cure the first Gonorrhœa in one, two, or three days; and the healing or astringent Injections are convenient to be used only when the Running is a simple Gleet, and perfectly pellucid, after the former have been continued some time. The only Objection

^a *Vide* Præf. ad Scriptor. de morb. Gall.
^b *Opera*, Vol. I. p. 353.

this Method is the making too speedy Cures, for which the Patient may think he pays too high in proportion to the Attendance and Medicines used; but this Opinion can prevail only with the Covetous and Inconsiderate. In the last Species of the Gonorrhœa, the Cure it must be owned is much more difficult, as it is more out of the reach of the Medicine, and the Ulceration sometimes spreading causes an Abscess in Perinæo after a considerable Inflammation and Distension about the Neck of the Bladder. Here therefore it will be proper to give the alterative mercurial Pills, to dilute plentifully with thin Liquors, and to use such things as deterge the urinary Passages, particularly the following Drops, namely, the *tinctura cantharidum ad pharmac. Edin.* gradually increased to a hundred drops more or less, two or three times in a day. A Swelling of the inguinal Glands, termed a Bubo, is to be dispersed either by bleeding and mercurial Unction with lenient Purges; or if it cannot be dispersed, it must be brought to Suppuration with a Galbanum Plaster; and then opening it either by Incision or the Caustic, it must be deterged and healed. An Inflammation and Tumor either of the Penis or Testicle

Testicle must be removed by bleeding, with the application of an emollient discutient Cataplasm, and the Weight of the Testicle is to be supported by a Bag-truss. Shankers are to be removed by fumigating with Cinnabar, and by the use of alterative Mercurials internally.

Q. 253. What is the proper Nature and Treatment of a Pox?

A. This, as we observed before, is either topical, when the Infection is confined only to some particular Part of the Body; or universal, when it has spread throughout the whole Habit. Thus the Lues may be contracted without any preceding Gonorrhœa, if the contagious Matter is absorbed through the Skin of the Prepuce, without ever entering the Urethra; whence often arises Shankers, Buboës, and sometimes a Scabies, from the Matter spreading through the cellular Membrane and lymphatic Vessels under the Skin. We may commodiously divide the venereal Lues into three Kinds; the first and mildest of which is when Shankers, Buboës, and a cutaneous Scabies attend; and this Kind may be cured without a Salivation by Mercurials rendered alterative with Camphire and Diapho-

Diaphoretics. But when the Disorder has spread not only through the Fabric of the Panniculus adiposus, but likewise has extended itself therewith into the Bones, so as to produce Nodes, nocturnal Pains, internal Ulcers, &c. in that Case nothing less than a spitting raised by Mercury will suffice, and that even in a degree proportionable to the Disease itself. The third and last Kind of the Disease is when the forementioned Symptoms are likewise attended with a Cachexy, and great Weakness of the vital Powers; in which Case Mercury does not exert its due Action upon the Fluids in the smaller Vessels for want of a due Strength in them; and in these Cases, though Salivation should be raised with difficulty, and continued for some time, yet the Disease will not be cured but by sweating, and drinking large quantities of the Decoction of Guaiacum made very strong, and drank to the quantity of three Pints every day before the Patient is put into the Stove, which is to be practised for about a fortnight, sweating him, according to the Patient's Strength, from a quarter to half an hour, first in the Stove, and afterwards for half an hour or an hour longer in Bed. Thus the Juices are more intimately resolved, the
Lymph

Lymph attenuated, and the morbid, fat, or oily Parts washed out more effectually than by a Salivation itself, as is sufficiently apparent from Experiment; for when a spitting has been attempted to be raised by Mercury, after the sweating Method has been used, it has been found impracticable. The best and safest Method of raising a spitting is doubtless by Uction, rubbing in about as much of the Ointment as contains a scruple of the Mercury every day; or, in precarious Habits, every other day, upon the Limbs and Back, or upon the Limbs only; taking care to watch the Mouth and Symptoms after the second Uction, which must be repeated to the third, fourth, or fifth time, if the Symptoms of a spitting do not arise before; such as a Heaviness and Pain in the Head, a quick and full Pulse, Stupor of the Teeth, Redness and Inflammation of the salival Ducts in the Mouth, with a Swelling of the Glands, Tongue and Cheeks, with a stinking Breath, and frequent flavering. When the spitting comes on, the Uction must be laid aside; or if the Mercury acts too suddenly, and with too great Violence upon the Head, it may be checked by a lenient Purgative, or by bleeding at the Arm. If it inclines to run off by
a Diar-

a Diarrhæa or a Diabetes, the Body must be kept warm or well covered, and Opiates with Diaphoretics used internally; supplying the Patient with plenty of Ptisan, or thin chicken or veal Broths. Thus is the spitting to be kept up to about the quantity of three or four pints every day of twenty-fours for about a fortnight or three weeks; or if it does not arise to that quantity in a day, more Uction must be rubbed in. In the mean time, if it has a Tendency, as we observed before, to run off by a Diarrhæa, it must be checked by Opiates, burnt Claret, and Diaphoretics. If the Mouth and Fauces are much swelled and inflamed, or painful, they must be frequently washed with a Gargle of the common Emulsion, with Liquorish and a little *spiritus nitri dulcis*. But in cachectic Dispositions, with a scrophulous or scorbutic Acrimony of the Juices, the sweating Method, with the Decoction of Guaiacum, as before-mentioned, will be most convenient. But for a more particular Account of these Matters, the Reader may consult *Astruc* in his *Treatise of Venereal Diseases*, who is the latest and fullest Writer upon the Subject.

Angelicus officinalis

Place this Leaf after Fol. 271.

N° 1. Clyisma purgans, refrigerans revulsivum.

R Fol. Senn. ℥j. Flor. Cham. ℥ss. decoque in aq. font. ℥x. colaturæ adde salis gemmæ ʒvj. M. F. Enema.

N° 2. Fötus antisepticus discutiens.

R Flor. Sambuc. Chamæm. contus. āā M. j. Theriac. Lond. ℥j.

Salis Ammon. crud. ʒvj.

Coquantur in vin. alb. acid. lbj.

N° 3. Cataplasma suppurans.

R Rad. Lil. alb. vel alib. ℥iv. Ficum ping. ℥j. coctis in aquâ & contusis, adde cepar. crud. contus. ʒvj. Galb. in vitel. ov. solut. ℥ss. Ol. Cham. infus. ℥ij. Farin. sem. Lini q. s. M.

N° 4. Cataplasma discutiens.

R Rad. Bryon. ℥ij. Irid. nost. ℥j. Flor. Cham. Sambuc. āā ℥ss. Aq. font. q. s. Coque ad tene-ritudinem & magmati contuso adde Gum. Ammon. in acet. solut. ℥ss. Salis Ammon. crud. ʒij. Theriac. ℥j. M.

N° 5. Pulvis (Angelicus dictus) Escharoticus, digestivus.

R Alum ust. Merc. præcip. rub. āā ʒj. M.

N° 6.

N° 6. Balsamum Vulnerar. epulot. Freyeri.

℞ Bals. Tolut. vet. Coloph. nig. āā ℥jss. Mellis
communis recentis ℥j. Gum. Sarcocol. Mastich.
Croci āā ℥j. — Myrrhæ Benz. āā ℥ss. Sp.
vini Gall. ℥xij. Infunde simul in balneo mariæ
ut fiat ope caloris solutio s. a. Coletur ad usum.

N° 7. Bals. calidum deterfivum.

℞ Sumit. Sabin. Centaur. min. āā ℥ij. Gum. Myr-
rhæ ℥ij. Terebinth. Venet. ℥ij. Sp. Vin. Gal.
℥xij. Præparetur ad usum ut prius.

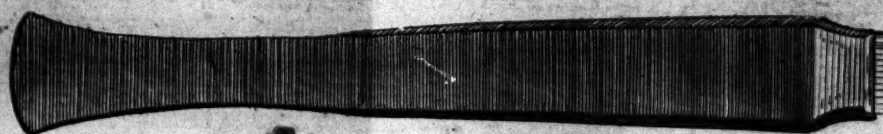
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N. 6. Balsamum Volucrium. epulor. Pigeon

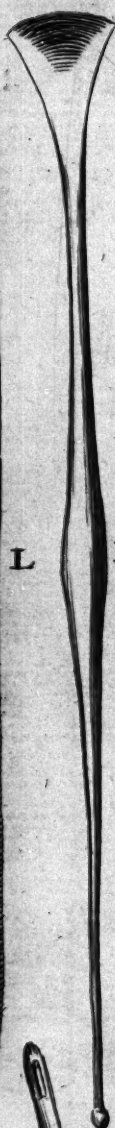
R Bals. Pigeon. unc. Coq. nig. aa ʒij.
communis recentis ʒi. Gum. Sarcocoll. ʒij.
Croci aa ʒi. — Myrica Bala. aa ʒij.
vini Coll. ʒij. Infunde hanc in balneo Mariae
et fiat ope coloris solutio. a. Colatur ad

N. 7. Bals. callidum deterrivum

ʒi. Summ. Sabin. Centaur. min. aa ʒij. Gum.
rba ʒij. Persebina. Vini ʒij. ʒij.
ʒij. Preparatur ad usum ut prius



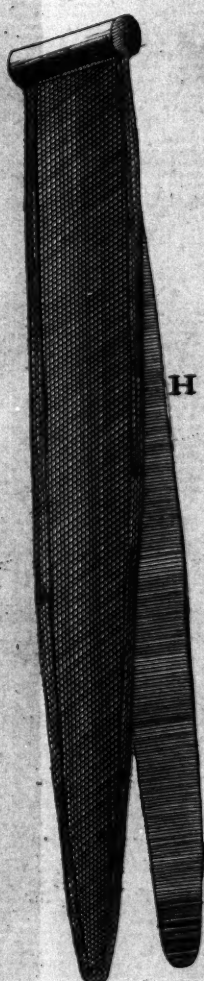
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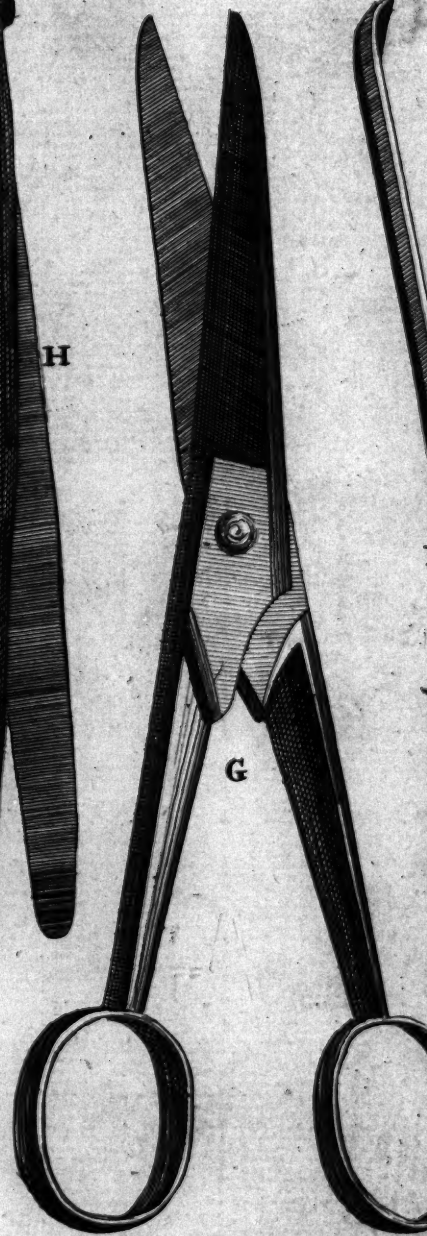
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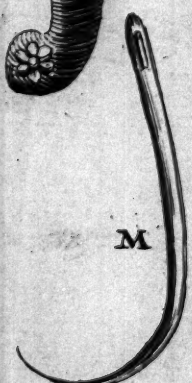
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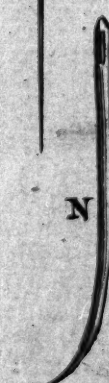
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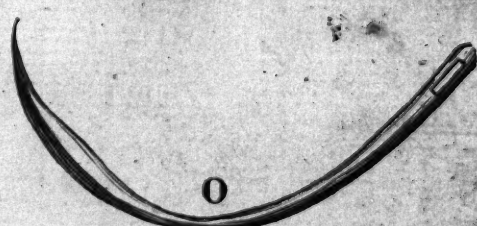
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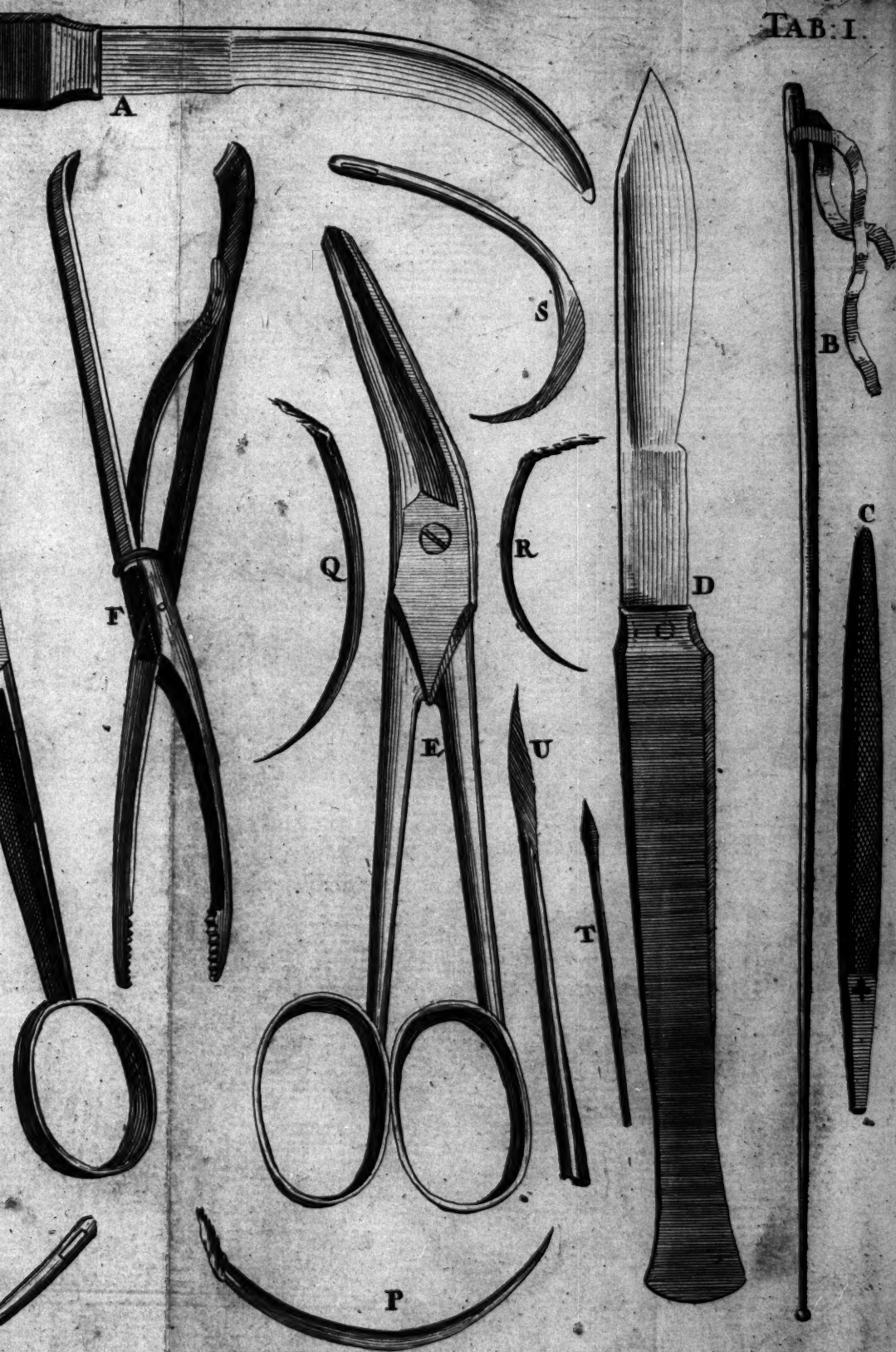
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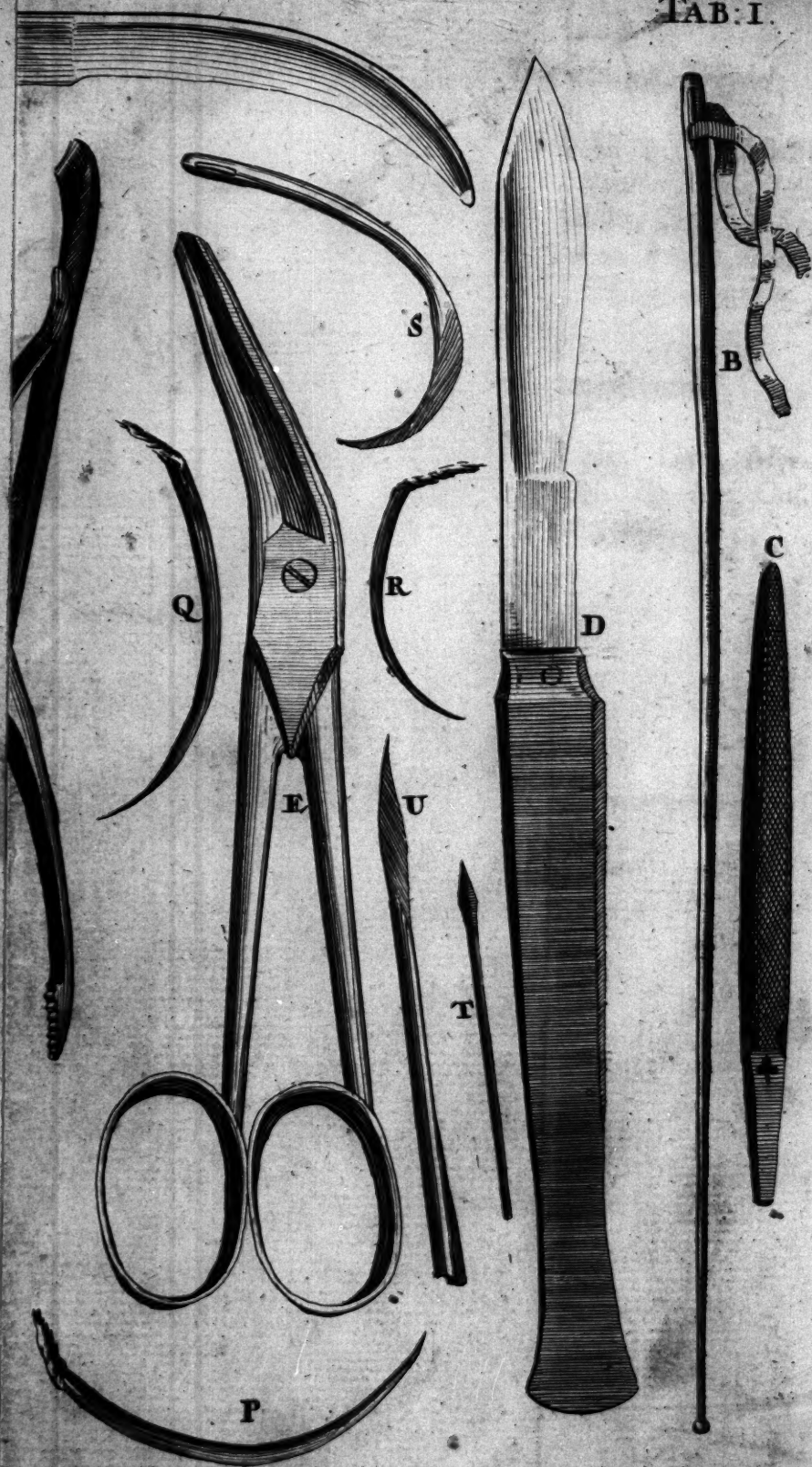
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TAB: I.



An EXPLANATION of the
Figures in the Copper - Plates,
which are added to illustrate the
several Operations before described.

An Explanation of Tab. I.

A **R** Represents a crooked *Scalpel* with an obtuse point or button for the operation of the Bubonocoele, to avoid injuring the intestines; serving also for enlarging an opening into the thorax, without wounding the lungs or intercostal blood-vessels. The handle of this and all other knives should be made of the lightest wood that can be procured, that the resistance made to the blade in dividing the parts may be better perceived by the hand.

B Denotes a common silver *Probe* with a globular point, and an eye armed with a ligature or skain of silk, which being spread with some balsam, or other medicines, may by this means be conveyed thro' a gun-shot, or other pervious Wound or Ulcer, which has two openings like a seton. Of itself it serves to examine the extent and course of wounds, ulcers, &c. for which reason it is form'd of the purest silver, that it may be easily flexible into any posture as may be judged most convenient. Some of these Probes are made with an half eye, and with a triangular sharp point, that lint may be

T

fixed

fixed in the former, or wound about the latter, and be thereby convey'd, either dry or armed with proper medicines, to the bottom of an ulcer or hollow part, &c.

C A small *File* for levelling the asperities of the teeth or their stumps, when they wound or irritate the tongue so as sometimes to threaten a cancer.

D Represents a round-edged *Knife*, fixed in a light wooden handle, and serving to cut for the Stone, and for most of the other operations which require a knife.

E A pair of crooked or *Probe-Scissars*, used chiefly in a *Fistula* of the *Anus*, and to divide the soft parts as they follow the probe: but as they pinch or contuse the parts they divide, the knife is therefore much preferable where it can be applied.

F Exhibits a pair of *Spring-forceps*, with pickers at one end for extracting splinters, thorns, &c. and with teeth at the other end for holding fast any slippery membranous part or vessel, to remove dressings, &c. They are better made of steel well polished than of silver, for greater strength and neatness.

G Represents a pair of common strait *Scissars* for the cutting of plasters, compresses, bandage, skin, flesh, &c. and for any other purposes which require *Scissars*. Of these there should be several sizes in the chest or study; but those here represented for the pocket-case have usual-

ly the shafts made of silver, as also have those called *Probe-Scissars* marked E.

H Gives us the figure of a pair of *Spring-pliers*, serving chiefly for anatomical purposes, to clear parts by stripping off membranous filaments, or by raising them so as to dissect them to more advantage. They are to be made of steel, and will upon occasion suffice for all the purposes of those before-mentioned F.

I A small silver or ivory *Probe* or *Stilet*, with a pretty large globular head at one end, and a small sharp point at the other. This with the next *Probe* marked

K, furnished with a thin flat edge at one end, serve for discovering a fissure in the cranium, and for other purposes, wherein their figure gives them an advantage over the preceding *Probe* marked B.

L Represents a strait double-edged *Bistoury* or *Incision-Knife*, which may serve upon all occasions where a large lancet is required, as for cutting issues, making the first entrance into an abscess, &c.

M, N Represent crooked *Needles* for stitching up deep wounds of the skin, where the common, strait, triangular-pointed *Needle* cannot be so conveniently applied.

O, P Represent crooked *Needles* of different makes, serving for the tying up of any blood-vessels, as the crural and humeral arteries in

amputations, the spermatic vessels in castration, &c. That marked P is armed with a ligature or thread of a convenient size, which may be best made of the flaxen thread used by shoemakers, folded four, six, or eight of them together, and waxed; and this is not so apt to cut the vessels, as smaller and common thread. This needle P is of a middling size, not much too small for the largest vessels, nor much too big for the lesser: however, it will be convenient to have some of a size or two larger, and some of a size or two less, made of steel well temper'd, that they may neither bend nor break. Their incurvation should be such, as to form a perfect segment of a circle, which will enable them to pass with greater readiness round any vessel. The convex surface of the needle tending to a point is flat, from whence it rises up obliquely on each side towards the concave surface in a ridge; so that the needle is in effect triangular half way from the point, from whence it grows flat towards the eye.

Q Represents a flat crooked *Needle* armed with a sizable thread, being sharp-edged on its convex and concave side: this is formed thus to make the future of a tendon, and is large enough for the *Tendo Achillis*; for being thin and flat, it wounds but few of the fibres of the tendon, and passes more easily through so resisting a body. But as we have before observed, the ends of a divided tendon will unite without future, if they are only retained together, by keeping the parts in a proper posture with compress and bandage.

R

R A crooked *Needle* of the smallest size, armed with a ligature for taking up the lesser arteries, as those of the skin in opening an abscess, or of the scalp in the operation of trepanning, &c.

S Represents a round crooked *Needle* with a flat point for the same purposes, but less convenient than those preceding; though it is stronger, but more apt to slip in the holding of it.

T Denotes a silver or gold *Needle* armed with a steel point, which serves to introduce the rest in making the twisted suture for the hare-lip (*vid. Tab. C. Fig. 8, 9.*); afterwards the point is secured by fixing upon it a bit of wood, cork, &c. but those who value not the expence of the needle cut off the point.

U Denotes a kind of *Needle* like a larder for the same operation of the hare-lip, serving to introduce a gold or silver wire: but as this makes a larger wound, and contuses the parts more than the former, it seems less convenient.

An Explanation of Tab. II.

Fig. 1. Represents lint made up into various forms. (1, 2, 3.) dossils of lint of various sizes, (4, 5.) the same dossils secured round the middle by a thread for the more easy extracting them, (6.) an oblong pledget, (7.) G a circular pledget, (8, 9.) tents of different sizes. These refer to Q. 6. p. 5.

Fig. 2. Gives a view of various compresses. A B denotes a square and an oblong compress,

T 3

which

which are the forms most frequently used. **C D** longitudinal compresses, the first serving to fill up inequalities; and the latter being slit up to the middle at one end, adapts it to the declivity of some limb, wrapping over each other as in the foliated bandage for a fracture of the leg. **E** a triangular compress being of a great thickness, and applied in ruptures to prevent the intestines or omentum from subsiding through the rings of the abdominal Muscles. **F** a compress in form of a *Malta* cross, cut in this shape to surround or wrap over the extremity of a limb that has been amputated. **G** a perforated compress, having a square, round, or oval aperture to transmit the cannula in bronchotomy, or to give access to a wound, &c. **H** a compress divided at each end to near the middle, to facilitate its application round any limb whose surface is unequal, by folding the ends over each other. **I** a compress adapted to the humerus or shoulder wounded or luxated, being slit up at each lower angle towards the middle, the better to adapt it to the globular figure of the part. **K** represents the rhomboidal compress, which being divided in the middle forms two scutiform compresses. **L** represents the stellate or sextile compress, composed of three longitudinal ones crossing each other, and sewed together in the middle, which is sometimes applied upon an aneurism or varix, or over the end of a stump; for being thick in the middle, it may compress or stop up the opening of any vessel, or make resistance where a part is too much relaxed. **M** a spheroidal compress or ball, which being cut in the middle forms two hemispherical compresses: the former or spheroidal compress serving to fix under the axilla in a luxation of the humerus,

TAB: II

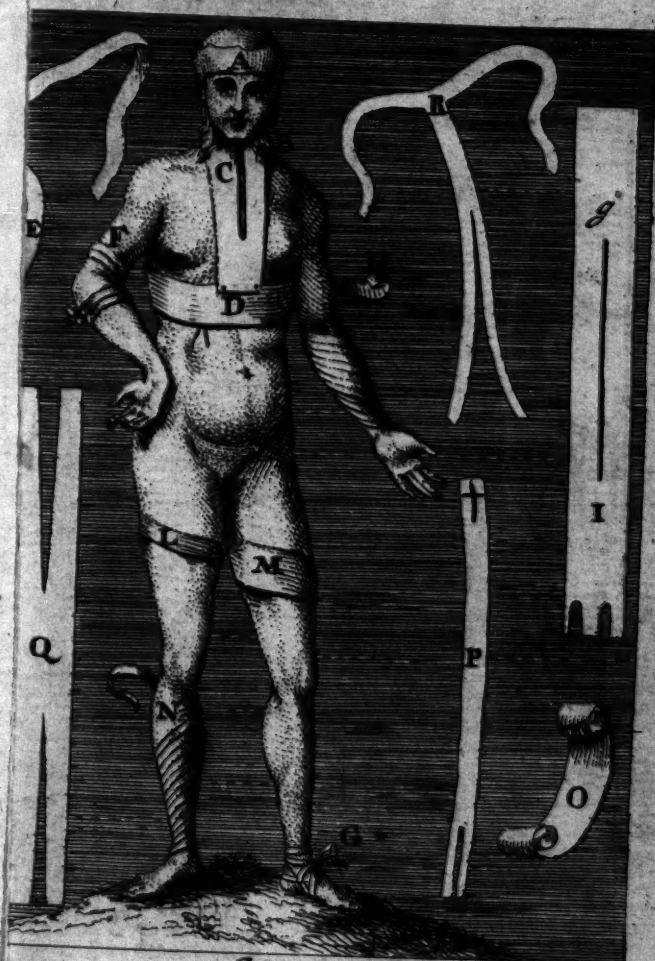
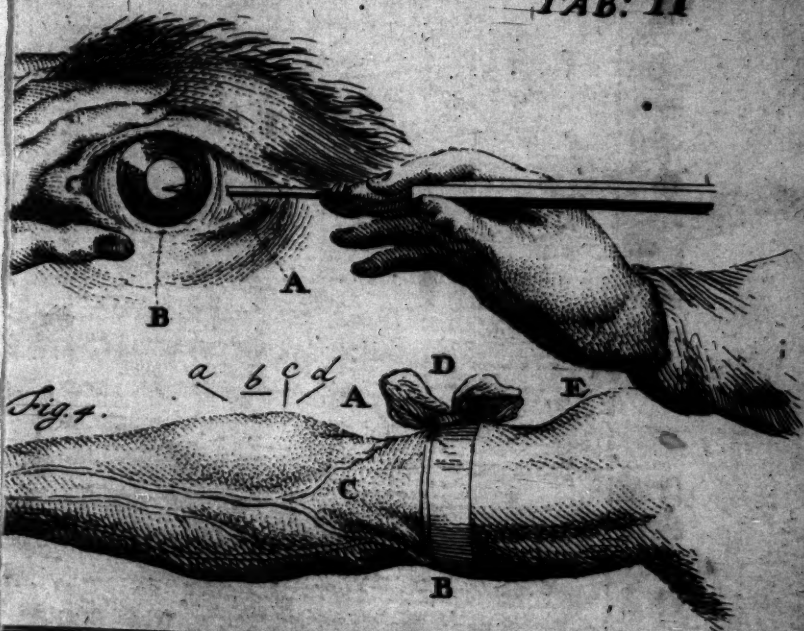


Fig. 3.

Fig. 1.

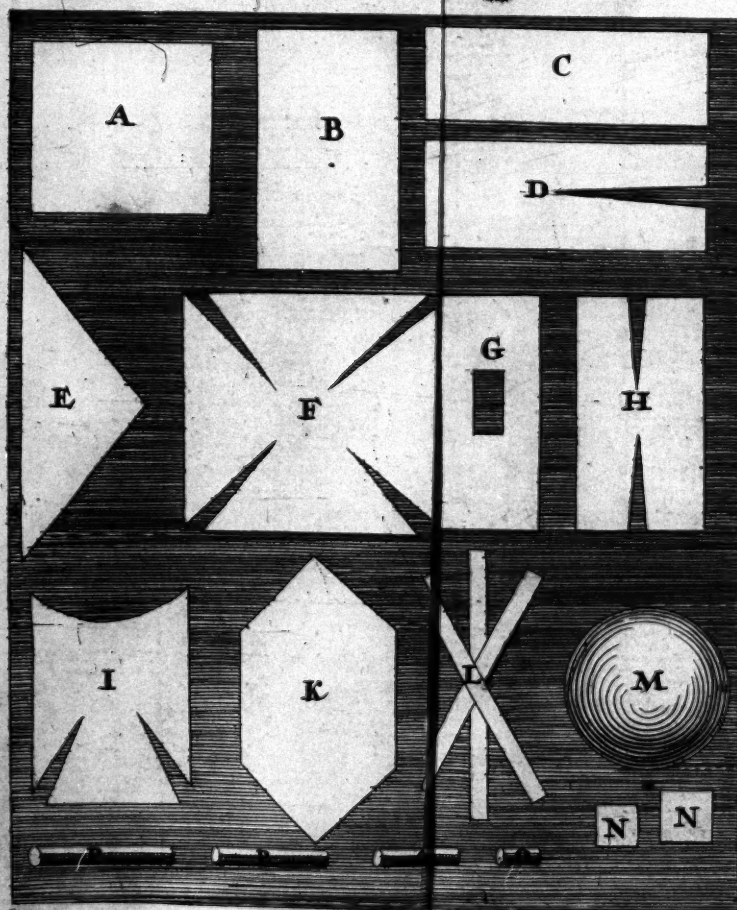
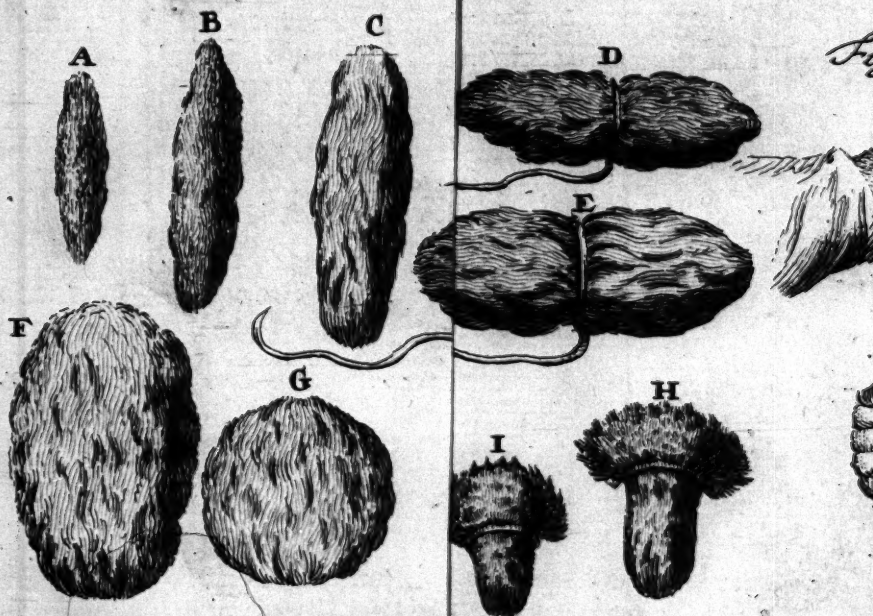


Fig. 2.

Fig. 5.



Fig. 4.

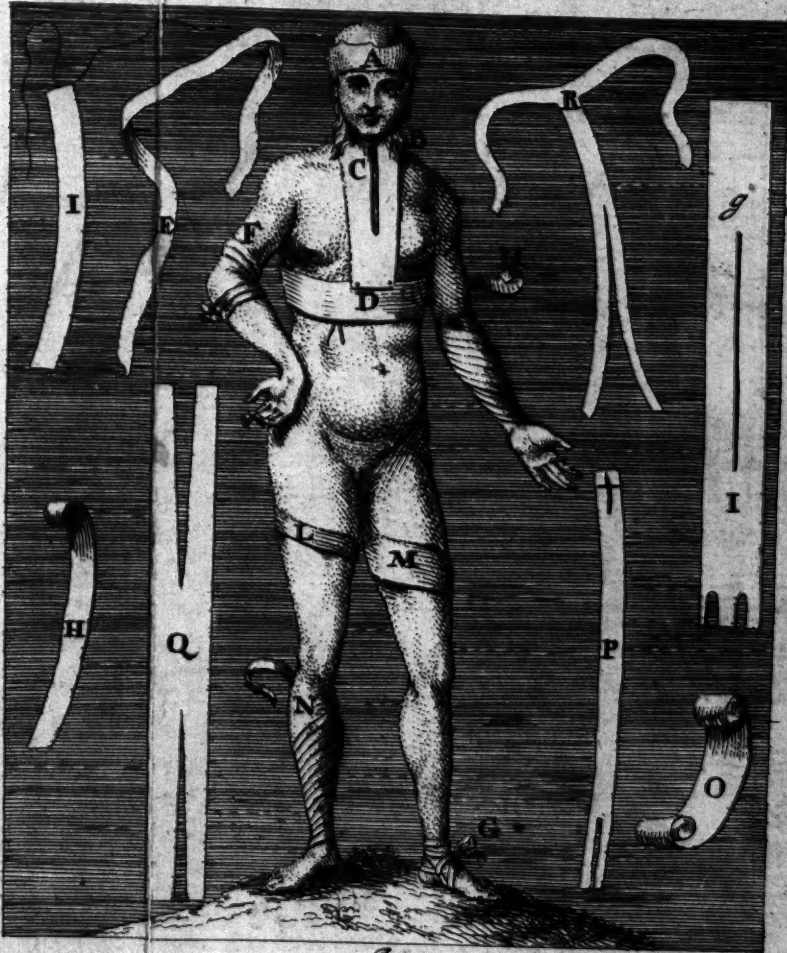
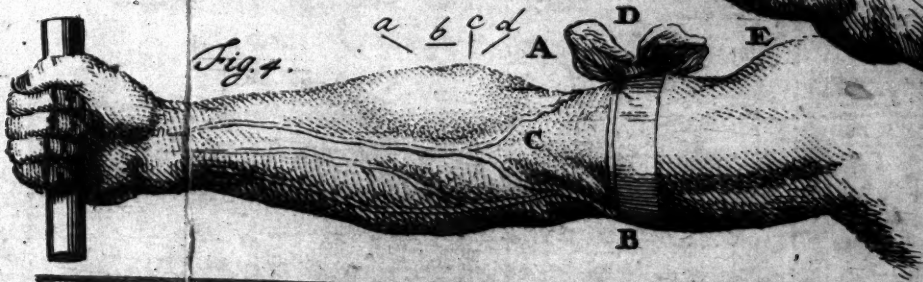


Fig. 3.

humerus, and the latter or hemispherical compress serves to fill up the palm of the hand, and stretch out the bones of the metacarpus in a fracture or luxation of them, &c. N N represent small square compresses to be applied after bleeding in the arm or foot. O O P P small cylindric compresses sometimes used to fasten the thread upon in tying up vessels, and in making the sutures of tendons to prevent the thread from distressing or cutting through the parts.

Fig. 3. Represents a view of the most general bandages both simple and compound. A the great kerchief or general bandage for the head, represented more at large in *Tab. S. Fig. .* C D represent the napkin and scapulary, or a general bandage in most disorders of the thorax and abdomen. The scapulary marked *g* is so called from resting upon the shoulders, and consists of a piece of linnen of two or three feet in length, and six or eight inches in breadth, slit in the middle to transmit the head, and fastened each end of it to the napkin D, which should be long enough to extend quite round the body. The napkin is to be folded three or four times together to make it of a convenient breadth for securing the dressings. F represents the manner of applying the fillet after bleeding in the arm. G represents the manner of applying the fillet after bleeding in the foot, both which may be seen more at large in *Tab. S. Fig. 1.* H the deloire or spreading spiral Bandage applied to the arm; N the same applied to the leg. E denotes a common fillet, loose, and to be applied after bleeding in the arm or foot, &c. I a short fillet with a thread fastened to the end for making the circular

cular or annular bandage. H a single-headed roller to be applied with one hand. O a double-headed roller to be applied with both hands, and in different directions. Q a four-headed bandage made by flitting it up at each end, which may be repeated two or three times more upon occasion on each side. P a small retentive bandage slit up at one end, and furnished with an opening in the other end, serving to secure the dressings upon a finger, thumb, penis, &c. It will also serve for an uniting bandage, when made of a greater length, to retain together the longitudinal lips of a wound instead of a suture. I, g, the scapulary bandage, which is supported upon the shoulders before and behind, as at C in the *Figure 1*. R the T bandage of *Heliodorus* made of two simple bands sewed together, being applied round the waste to retain the dressings after cutting for the stone, and in disorders of the anus and Perinæum; or in an inverted posture like the napkin and scapulary for dressings of the thorax. Sometimes there are two pieces sewed on to the wasteband at a little distance from each other, and then it is called a double T bandage.

Fig. 4. Represents the veins commonly opened for bleeding in the arm. A D the ligature applied with a slip-knot to compress the veins, and render them turgid. C denotes the median vein, under which the tendon of the biceps muscle usually lies. B the basilic vein, which runs up on the inside of the arm towards the elbow, having usually the cubital artery and brachial nerve seated underneath it. E the cephalic vein, which ascends along the side of the biceps muscle on the outer part of the arm, but having no tendon, nerve or artery

artery seated under it, may be therefore opened with more safety by an unskilful hand ; only being much less than the two former, it commonly discharges but little blood, and seldom in a full stream. *abcd* represent the course or direction of the orifice to be made by the lancet in the vein, namely, either oblique, which is most preferable, ascending or descending (*ad*) ; longitudinal, according to the course of the vein (*b*) ; or transverse (*c*). For it is observable, that wounds made obliquely with respect to the course of the fibres, heal more readily, and with a less scar than those made transversely ; because in the latter case the fibres contract themselves more, and do not apply their ends to each other with so large a surface : but if the orifice is made longitudinal according to the course of the vein, the sides collapse together by the touching of the skin, and the blood does not flow so freely, unless the skin be relaxed by bending the arm.

Fig. 5. Represents the proper part of the sclerotica, where the couching needle is to be introduced for depressing a cataract. *A* the couching needle, held like a pen in the right hand, with its point introduced near the center of the apparent white part of the eye. *B* the point of the needle appearing behind the pupil, while the eyelids are held open by the fore-finger and thumb of the left hand, which method is rather preferable to the use of the speculum oculi. The lower fingers of the right hand are supported on the patient's cheek to sustain the instrument, while it is entered at about the distance of half a quarter of an inch from the cornea.

An

An Explanation of Tab. III.

Fig. 1. Represents a lancet with a short blade *ab*, as that can be more commodiously guided, forming a large angle, or with broad shoulders towards the point *ac*, which is by the *French* termed a barley-grain point, being very commodious for opening of the largest and most superficial veins.

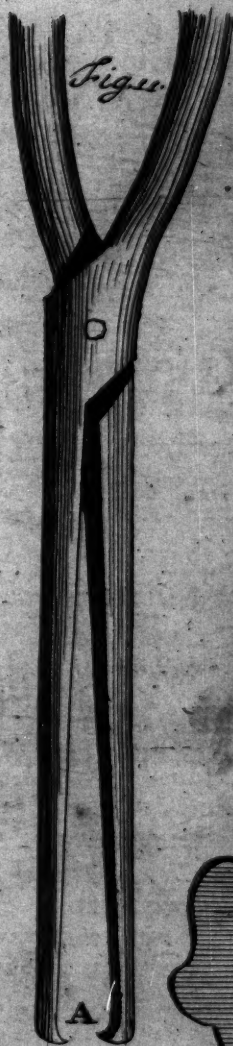
Fig. 2. Is a lancet with narrower shoulders and a still shorter blade, forming a more acute angle towards the point, being called by the *French* an oat-grained point, being more suitable than the former for the smaller and deeper veins.

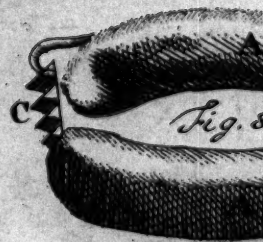
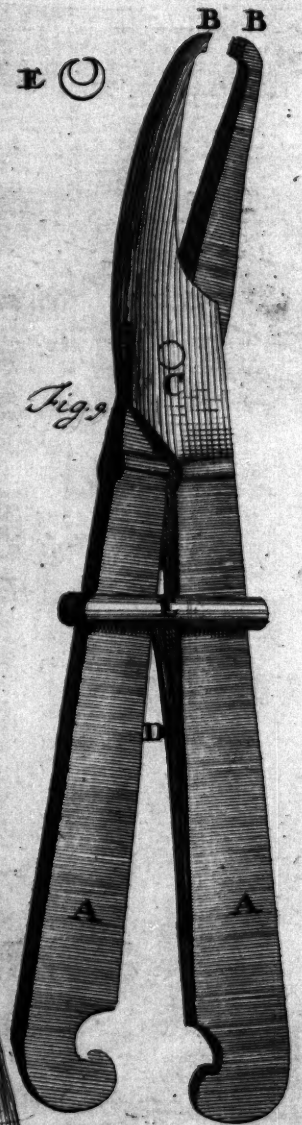
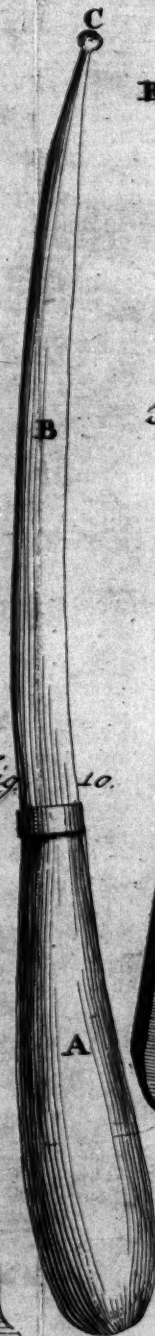
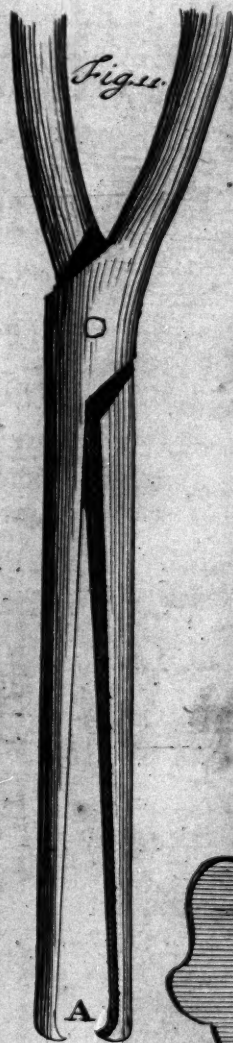
Fig. 3. Represents a smaller oat-grained lancet, extremely commodious for bleeding easy in a skilful hand, and when a vein does not easily appear.

Fig. 4. Represents one of the most acute-pointed lancets, called by the *French* a serpentine point: being useful for bleeding easy in a skilful hand, and to open very small veins in an infant, under the tongue, in the white of the eye, &c.

Fig. 5. Represents a small abscess lancet fixed in a ring, so as to be commodiously concealed in the hand, when there is occasion to make an incision, under a pretence of healing the part, in a timorous patient who will not admit of the knife.

Fig. 6. Represents the trefine, so called by *Woodal* from its having three ends, and prevails among us more than the trepan, as it may be
more





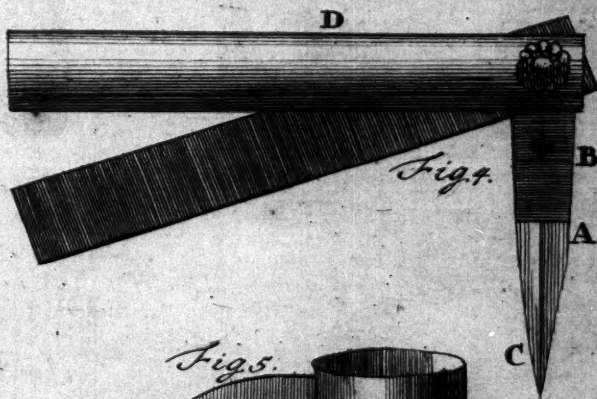
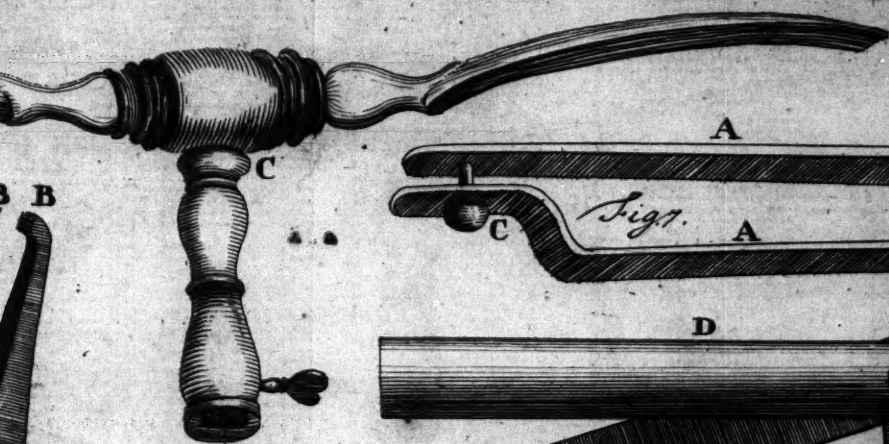


Fig. 6.

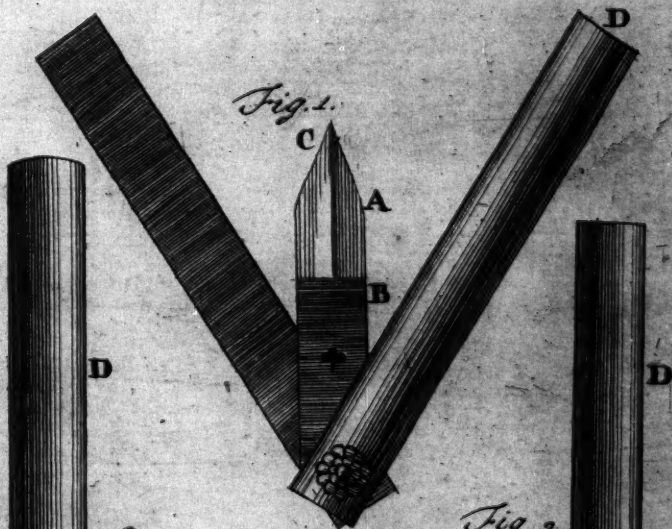
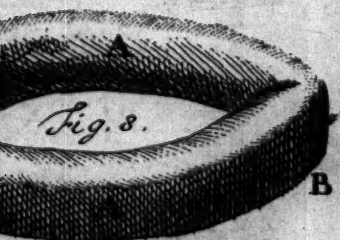
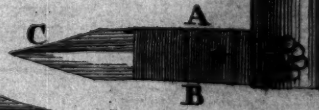


Fig. 2.



Fig. 3.



more conveniently held or directed to press more on one side than the other, according as the thickness of the bone may require. A C the handle of the trefine, into which is fixed the crown B, which is made cylindrical, or at least very nearly so; instead of being conical like the crown of the trepan, *Tab. a. Fig. 1.* which greatly expedites the working of the instrument, which being performed more slowly, and with more exactness and regularity than the trepan, is not in danger of wounding the brain in a careful hand; to avoid which, the crown of the trepan was at first formed of a conical shape. So that what in this respect seemed to be a very great improvement upon the ancients about an hundred years ago, is at present thought rather an incumbrance and impediment in a skilful and careful hand. However it must be confessed, that the trepan, *Tab. E. Fig. 1.* still prevails in most other parts of *Europe*; though the trefine is preferred by the most expert surgeons here at *London*.

Fig. 7. Represents a steel instrument called a yoke, to be wore upon the penis for an incontinency of the urine, being first covered with velvet: it opens with a hinge B at one end, and is fastened with a screw C at the other, and must be taken off when the patient has a call to make water. The compressure upon the Urethra may be lessened or increased by letting out or shortening the screw.

Fig. 8. Represents a yoke of another form clothed fit for use. A A the two plates or arms covered. B the hinge by which the two arms are joined. C a graduated ketch with a hook, whereby

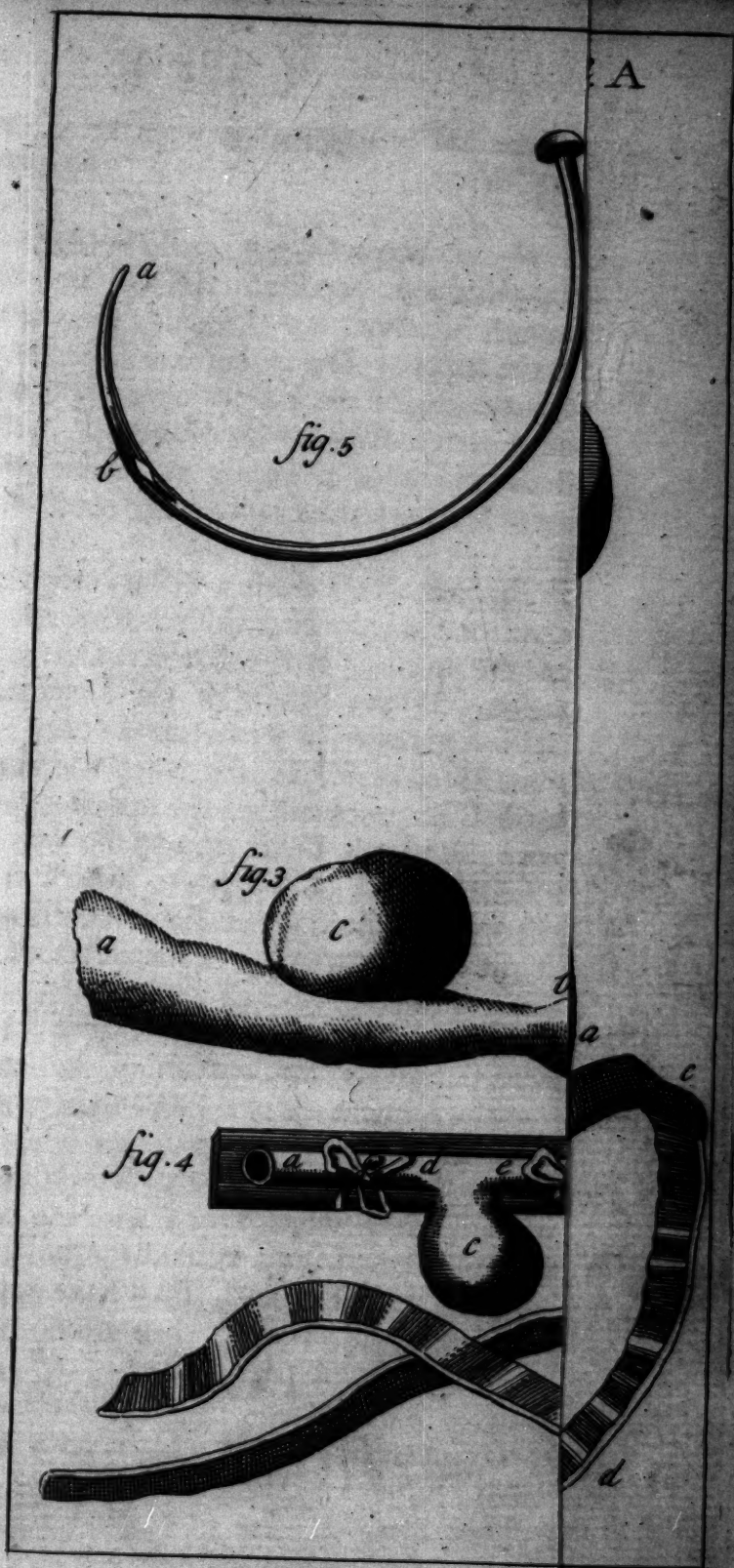
by the instrument may be contracted or enlarged at pleasure.

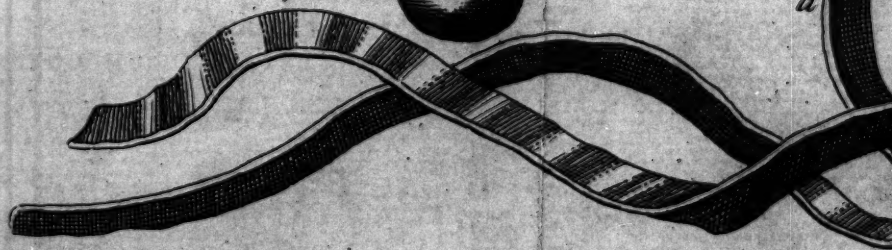
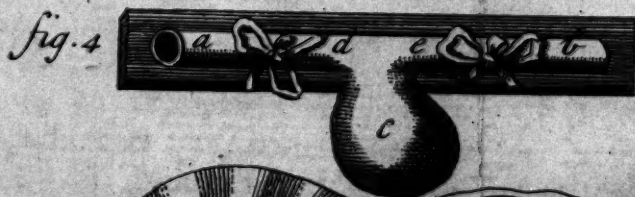
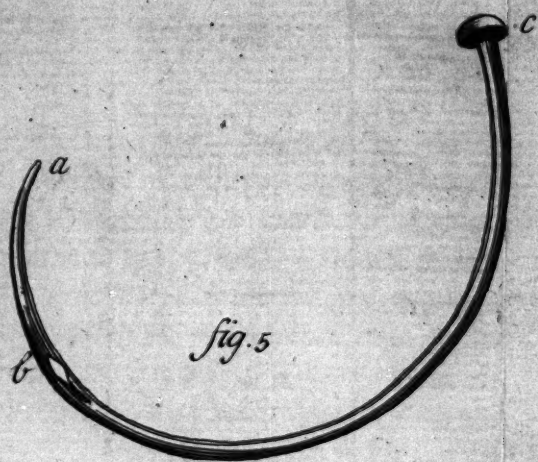
Fig. 9. Represents a needle-holder. A A two flat shanks or handles. BB the two sides of its mouth grooved for keeping the needles firm. C the hinge. D a spring which keeps the handles asunder, with the mouth open BB, until the sliding ketch E is thrust towards A A. This instrument holds a needle as secure as any, and more securely than most other tenacula.

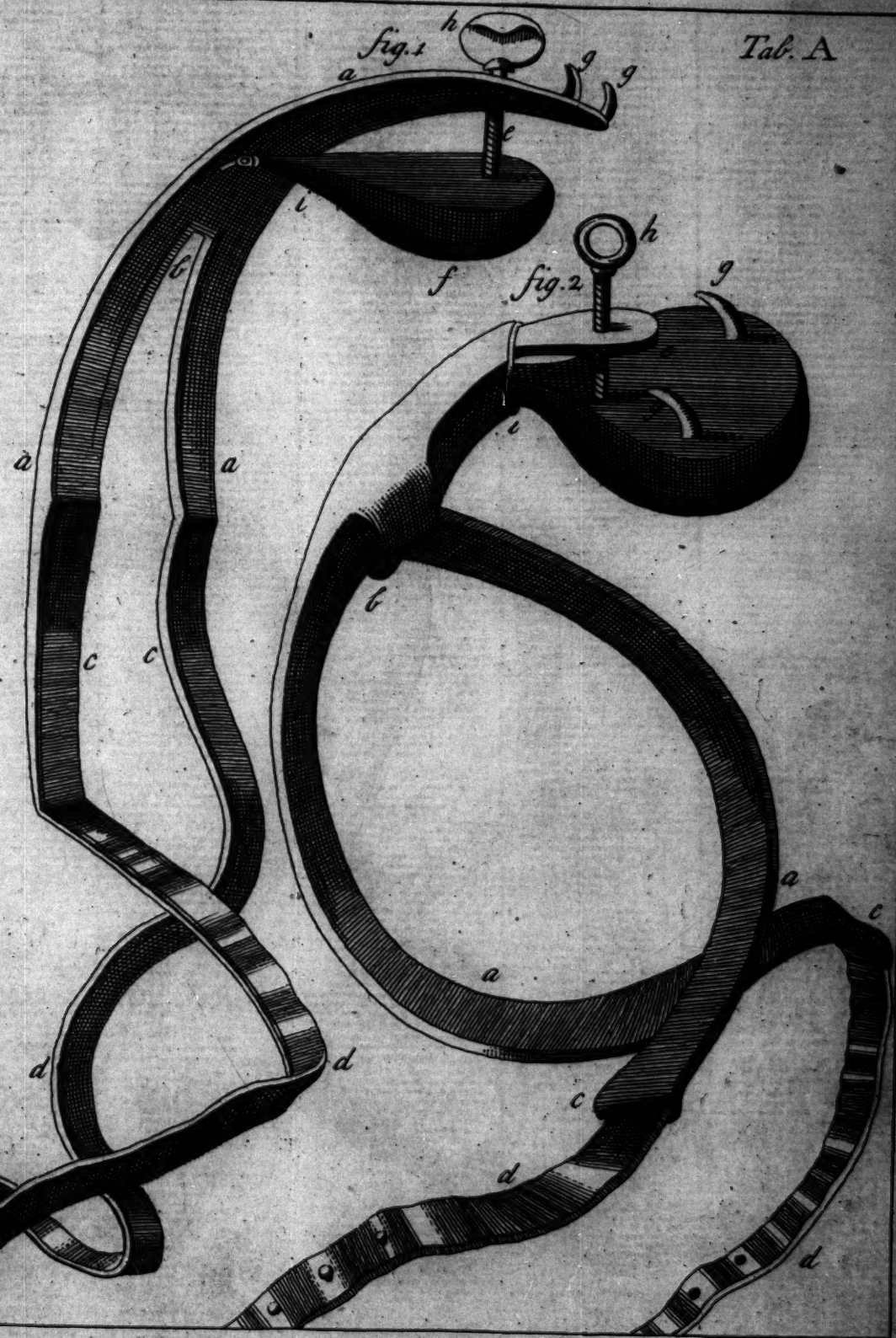
Fig. 10. Represents a bistory with a grooved director for enlarging wounds, &c. A the handle of the knife. B the blade. C a button at its point. D the handle of the director, having a hollow groove; a transverse section of which is represented at E, so that when the button of the knife C has once entered the opening of the groove near the handle D, it cannot slip out in opening a sinous ulcer, (if ought to which the common bistory and director are liable) until it passes out at the other extremity of the director.

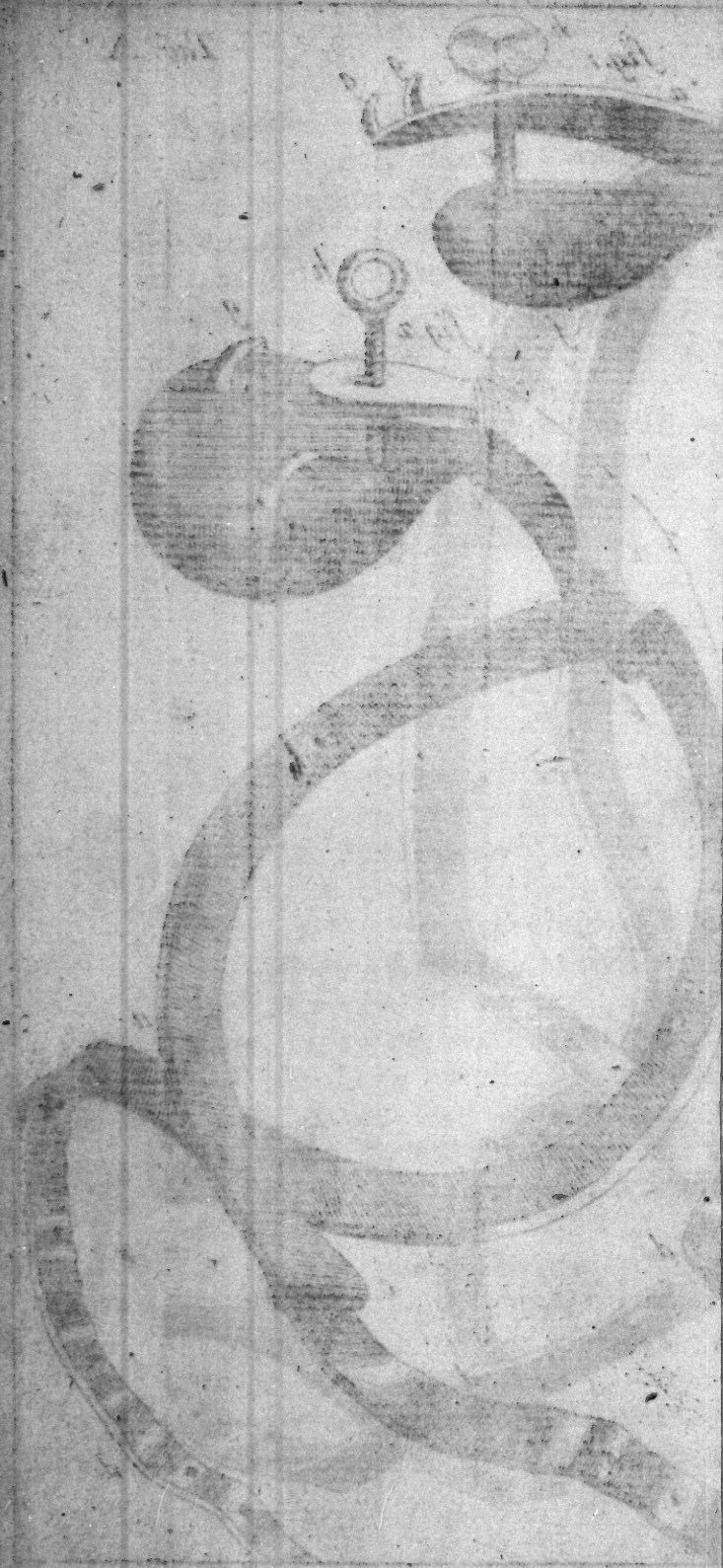
Fig. 11. Represents the blades of a pair of strong forceps for extracting bullets. In the mouth A there are two small sharp teeth on each side, which apply close together when shut. The forceps here represented may be introduced into a wound safely when shut; and the blades being opened immediately behind the bullet, the teeth piercing into the lead, may have sufficient hold to bring it out, though they are not advanced so far as the largest part of it.

Fig. 12. Represents a scarificator for the eyes made









made of the beards of barley, which being rough like the teeth of a saw, as may be seen in that marked A, several of them are therefore tied together into a brush, represented by B C. But although scarification of the eyes may be very useful in an ophthalmia, yet it cannot be so safely performed with this eye-brush as with a fine steel rasp of a convex figure, as in *Tab. X. Fig. 18.* for the teeth of the barley-ears being brittle, are left behind among the very sensible fibres of the albuginea, so as rather to increase the inflammation, or do as much hurt as the evacuation does good.

T A B L E A.

The Instruments for Aneurisms.

Fig. 1. Is an instrument designed for preventing and curing Aneurisms by compression; *aaa* denote the plate of iron or steel, adapted in form to the flexure of the arm; *b* its fissure; *cc* ligatures fastened to the ends *aa*, and extended to *dd*; *e* denotes a moveable steel plate joined by the hinge *i*, and covered with a bolster of cotton or silk at *f*, to be fixed upon the Aneurism. *gg* are two small hooks by which the instrument is fastened upon the arm by the ligatures *cc dd*. *b* is a screw by which the plate and cushion *ef* are pressed down upon the tumor.

Fig. 2. Is an instrument of the same kind with the former, but of a different shape. Here the plate and bolster *ef* are larger for bigger Aneurisms than the former. Its parts and explanatory letters correspond to those of the preceding figure. These instruments are to be applied for restraining

ing the enlargement of an incipient Aneurism, or for compressing those which are not very large, which by means of this instrument and a strengthening plaster, are sometimes compleatly cured without the operation. In the application of them the incurvated part *aaa* is to be applied so as to transmit the elbow, while the compress or cushion marked *f* comes over into the flexure of the arm upon the Aneurism; and the whole instrument is then to be secured by the ligatures *cc*, *dd*, fastened to the hooks *gg*.

Fig. 3. Represents a large Aneurism in the joint or flexure of the arm; *a*, *c*, the arm; *b* the Aneurism.

Fig. 4. Is an obtuse-pointed needle for conveying a ligature round the artery in the operation for an Aneurism, and to suppress hæmorrhages. *a* is the obtuse point, *b* the eye of the needle which transmits the thread, *c* the head or handle which may be more commodiously made flat, according to M. *Garengeot* about the breadth of one's thumb.

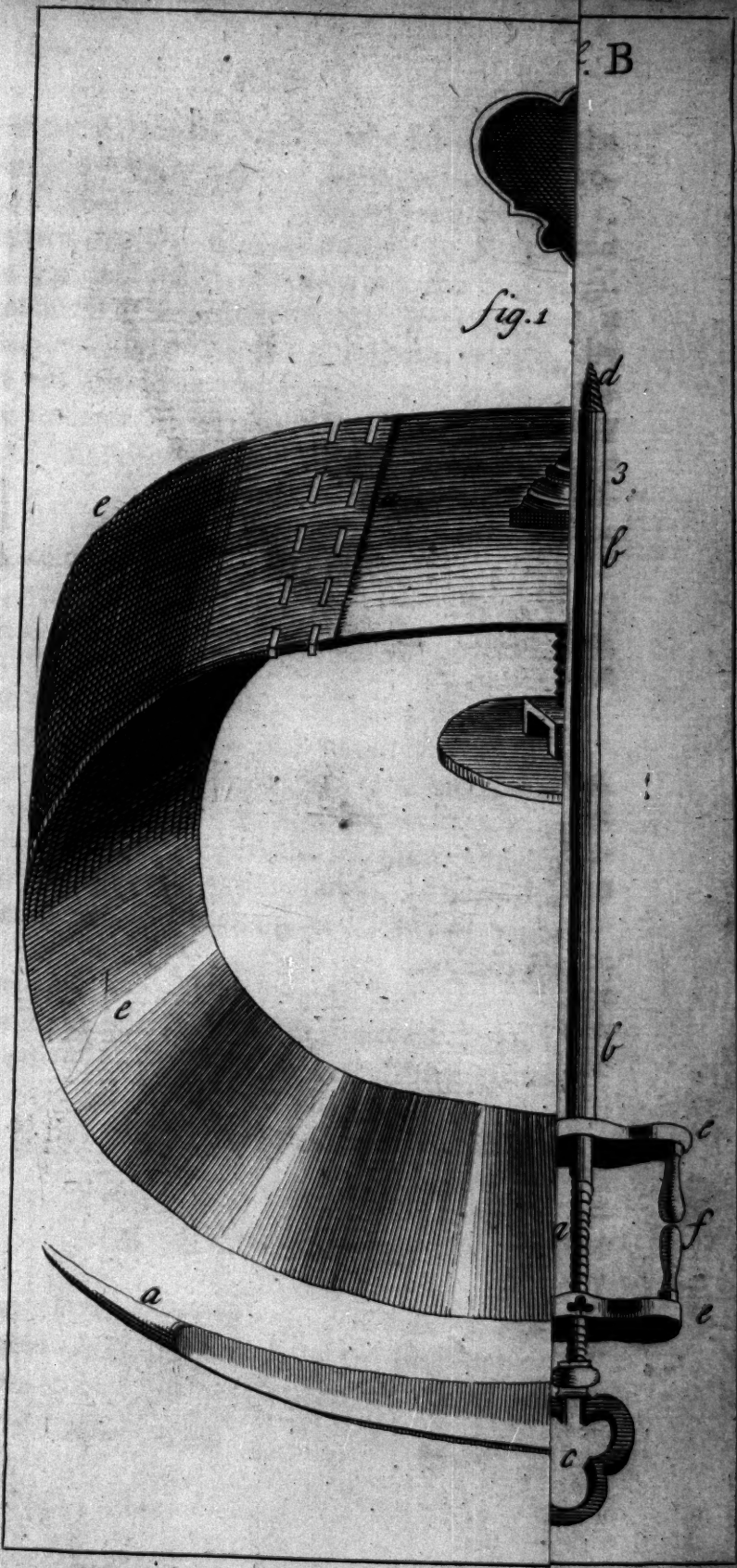
Fig. 5. Exhibits the manner of applying the ligatures above and below the Aneurism in the operation for that disorder. *a*, *b*, the artery, *c* the Aneurism, *d*, *e* the ligatures above and below the Aneurism.

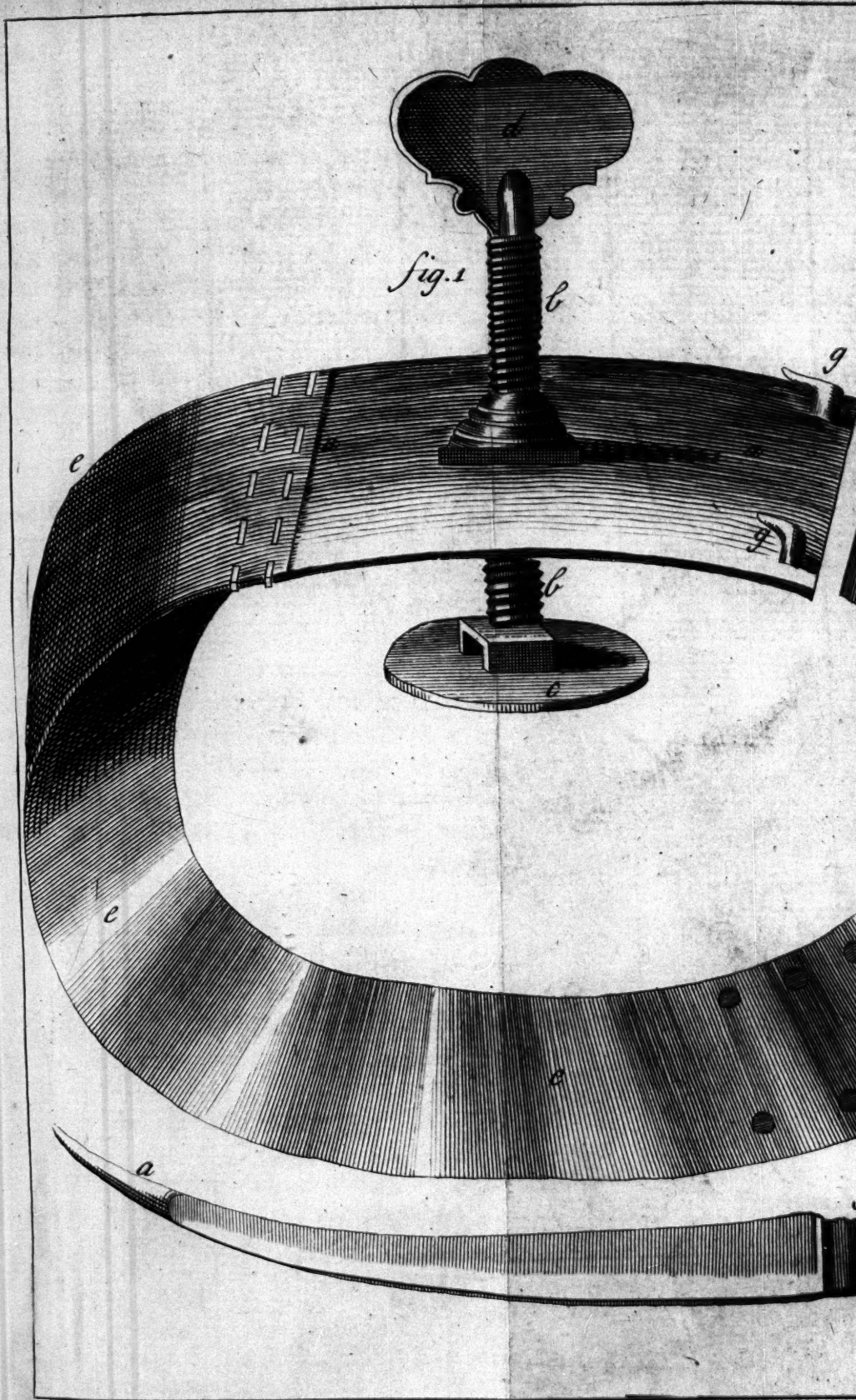
T A B L E B.

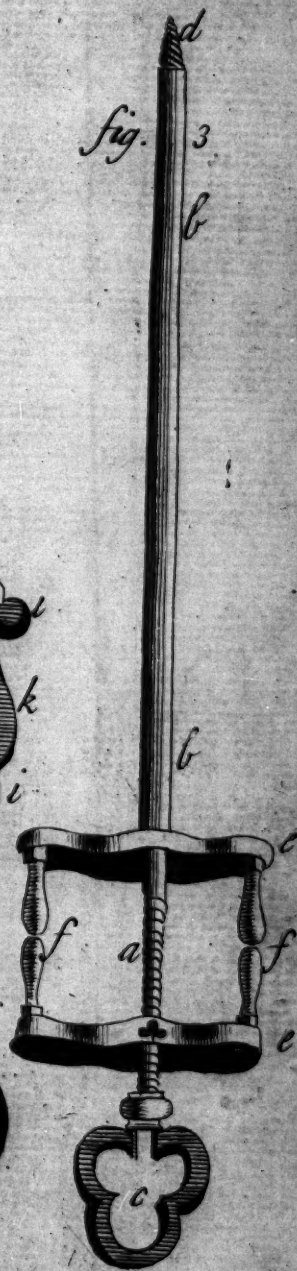
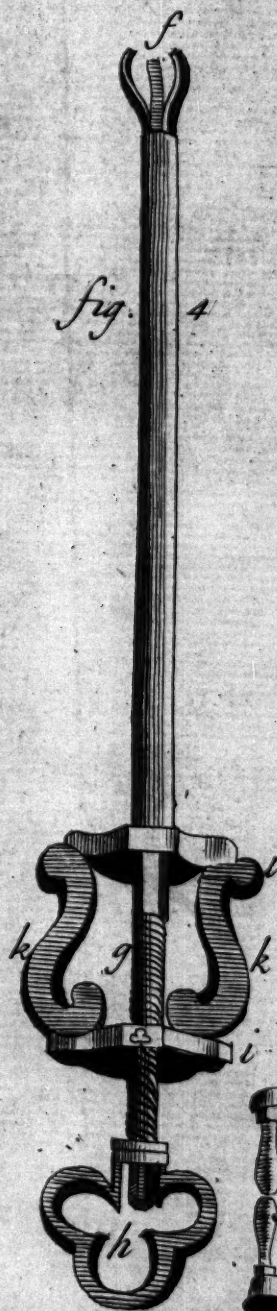
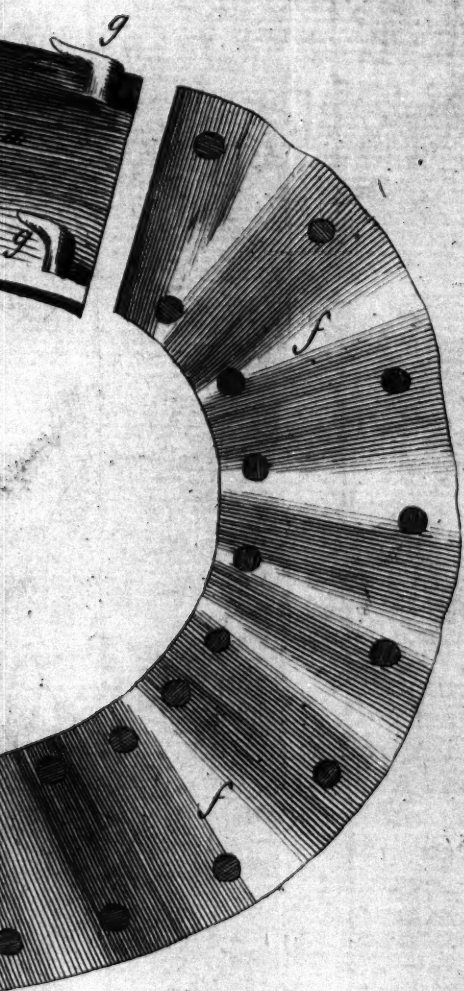
Fig. 1. A tourniquet to compress an artery in the operations for an Aneurism, or to suppress an hæmorrhage, consisting of a brass plate *aa*, of three

B

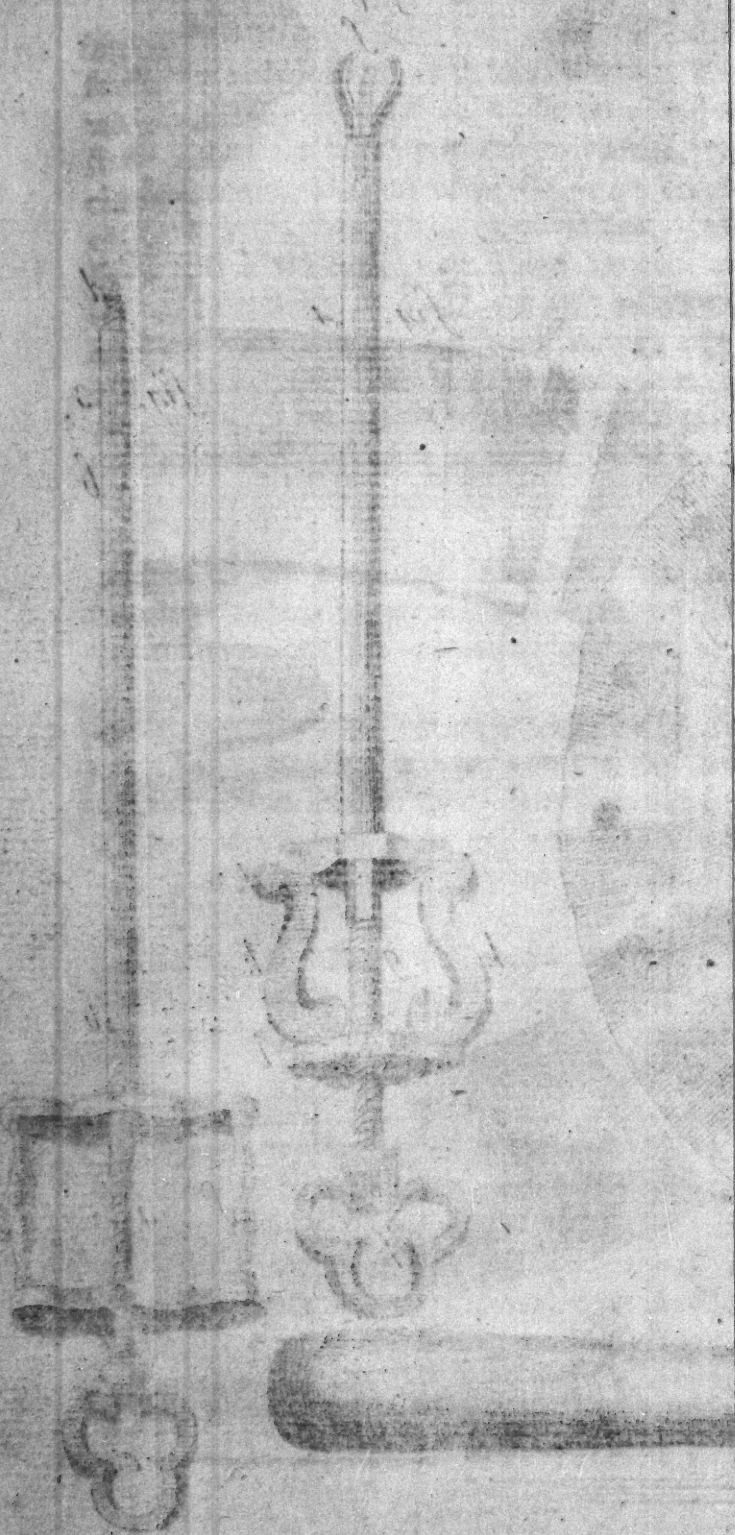
fig. 1







B



three inches long and two broad, perforated in the middle to admit a strong screw *bb*, which is provided at the lower end with a small round plate *c*, a piece of leather is strongly fastened to one end of the brass plate, of equal breadth with it, *ee*, *ff*. In violent hæmorrhages, &c. the instrument is fitted to the wounded part, and the end *f* is by means of holes that are made in it fastened to the hooks *gg*, so that the small plate *c* may exactly press upon the artery; and then the handle of the screw *d* is to be turned round gently, till a sufficient pressure is made to stop the course of the blood.

Fig. 2. An obtuse-pointed knife for enlarging wounds, or dividing the integuments without danger of injuring the nerves or blood-vessels.

Fig. 3. An instrument for extracting bullets, composed of a screw and a cannula, designed chiefly for extracting them when other instruments are insufficient, or when they are lodged in the bones. *a* denotes the screw by which it descends and ascends through the cannula, *b* the handle, *c* the bit which enters the bullet, *d* the cannula, *ee* two cross bars to sustain the screw and cannula; *ff* two pillars for sustaining the cross bars, taken from M. *Garengeot*.

Fig. 4. Is another instrument for extracting bullets in the soft parts; *f* denotes three branches which come through the cannula serving to take hold of the ball, *g* the simple screw turned by the handle *b*, and moving in the cross bars *ii*, sustained by the pillars *ll*, taken from M. *Garengeot*.

TABLE

T A B L E C.

Fig. 1. Exhibits the manner of uniting wounds by the dry suture, that is to say, with sticking plasters applied to the skin, so as to retain the wounded lips close together. *a* denotes two sticking plasters without indentations, *b* denotes two plasters of the like kind indented to expose the lips of the wound to view, and make way for the discharge of its matter, as well as for the application of medicines; *c* a single plaster of the like kind.

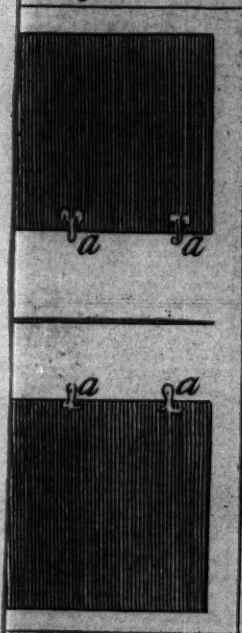
Fig. 2. Exhibits another manner of making the dry suture by sticking plasters, used by the ancients, which are fastened together by hooks and eyes *bbb*, or by a string drawn through them in the manner represented by *aaa*; and this method has the advantage of the former, inasmuch as by shortening the string, the lips of the wound may be more closely approximated without removing the sticking plasters.

Fig. 3. A large crooked needle, with a double thread, to make the quilled and other futures in large wounds. *a* the needle arched, *b* the double thread, *c* the bow end of the thread.

Fig. 4. *aa* denotes a large transverse wound united by a triple interrupted future *bbb*.

Fig. 5. Represents another transverse wound united by the quilled suture of *Palpinus*; *aa*, *bb* are two cylindrical rolls of silk or linnen spread with some cerate or plaster, *ccc* the slip-knots of the thread

fig. 2



Tab. C

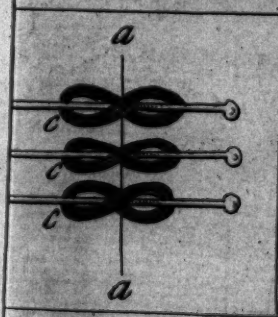
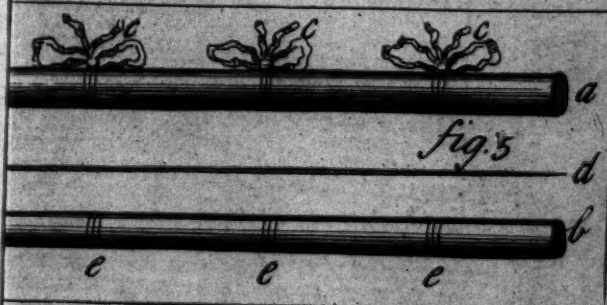
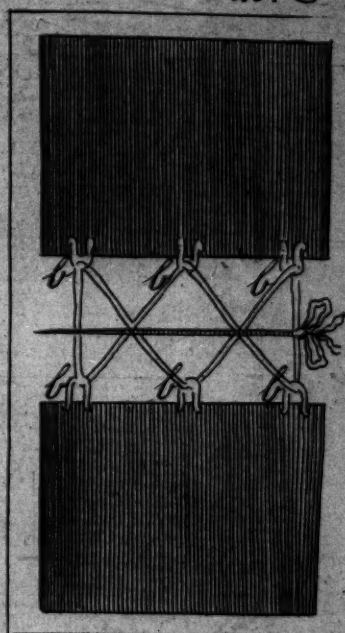


fig. 8

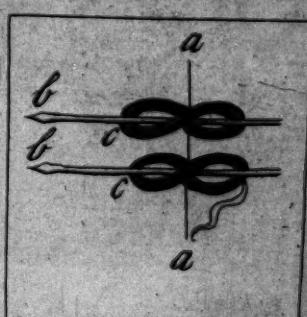


fig. 9

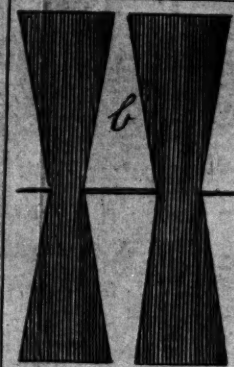
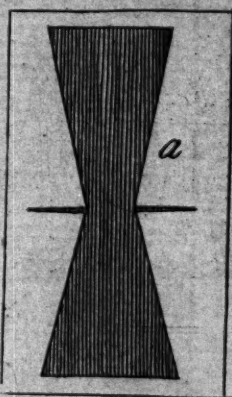
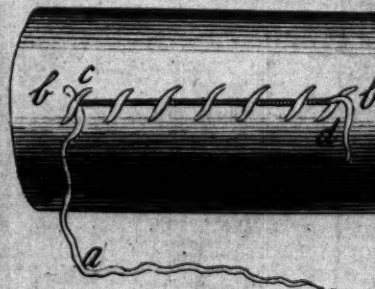
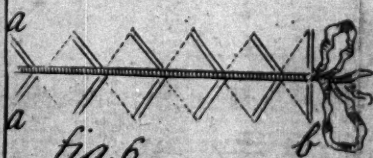
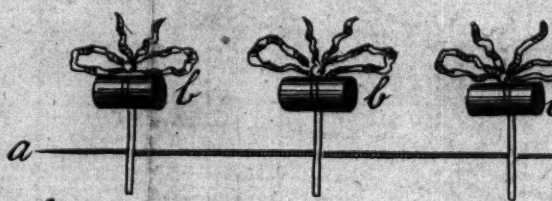
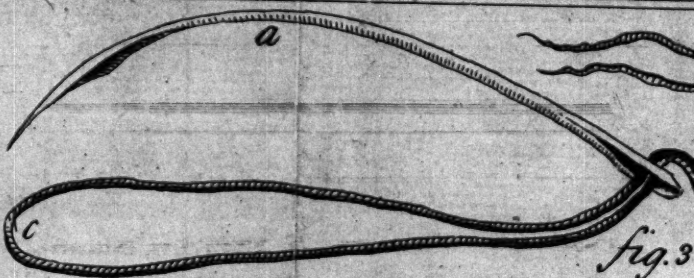


fig. 1



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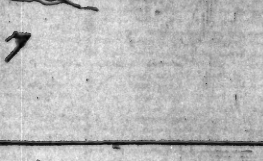
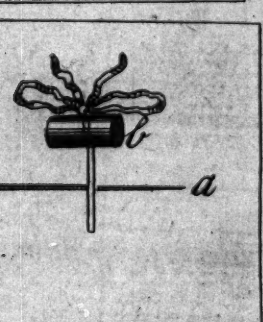
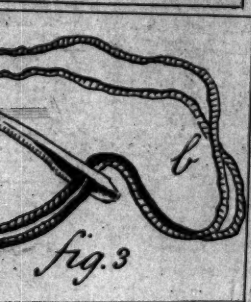
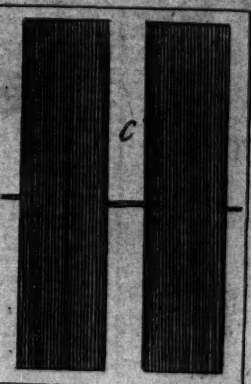
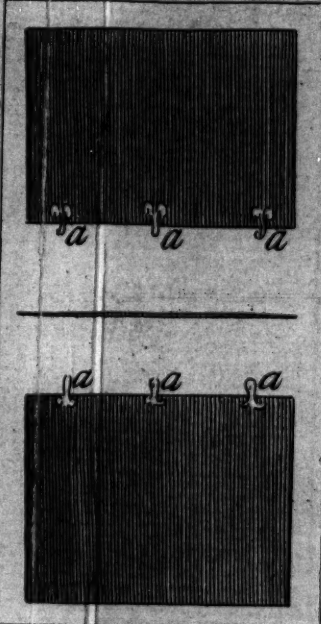


fig. 2



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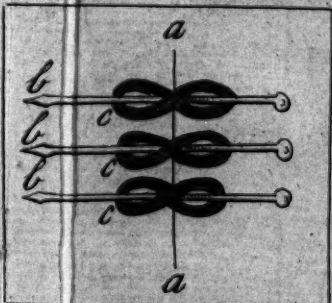
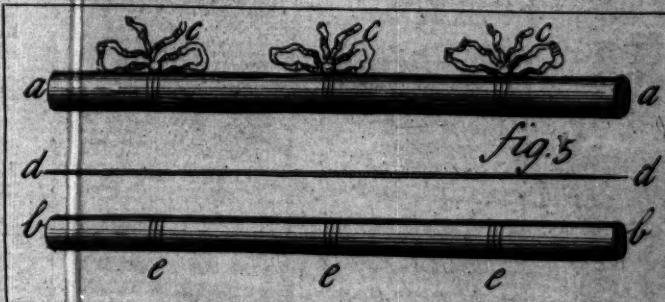
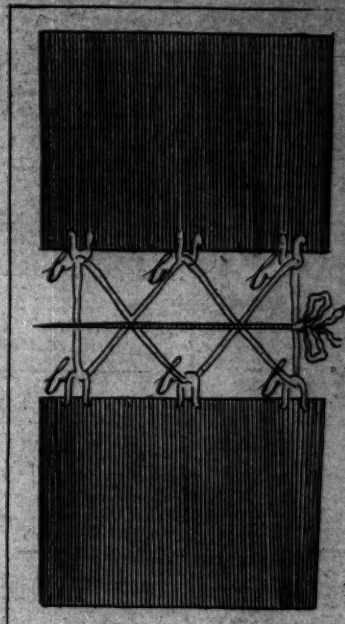


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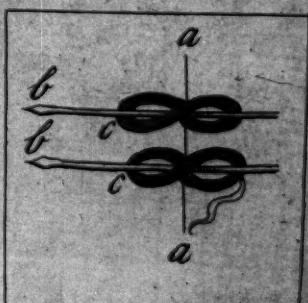


fig. 9

T A B L E C.

Fig. 1. Exhibits the manner of uniting wounds by the dry suture, that is to say, with sticking plasters applied to the skin, so as to retain the wounded lips close together. *a* denotes two sticking plasters without indentations, *b* denotes two plasters of the like kind indented to expose the lips of the wound to view, and make way for the discharge of its matter, as well as for the application of medicines; *c* a single plaster of the like kind.

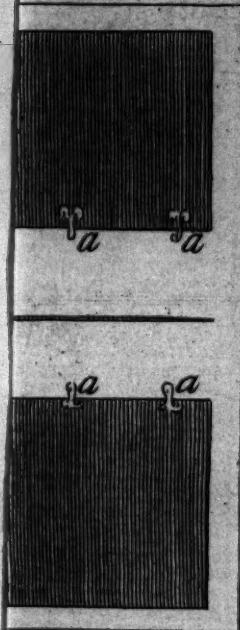
Fig. 2. Exhibits another manner of making the dry suture by sticking plasters, used by the ancients, which are fastened together by hooks and eyes *bbb*, or by a string drawn through them in the manner represented by *aaa*; and this method has the advantage of the former, inasmuch as by shortening the string, the lips of the wound may be more closely approximated without removing the sticking plasters.

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Fig. 4. *aa* denotes a large transverse wound united by a triple interrupted suture *bbb*.

Fig. 5. Represents another transverse wound united by the quilled suture of *Palsinus*; *aa*, *bb* are two cylindrical rolls of filk or linnen spread with some cerate or plaster, *ccc* the slip-knots of the thread.

fig. 2



Tab. C

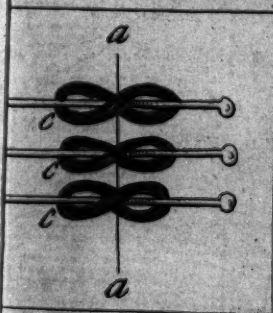
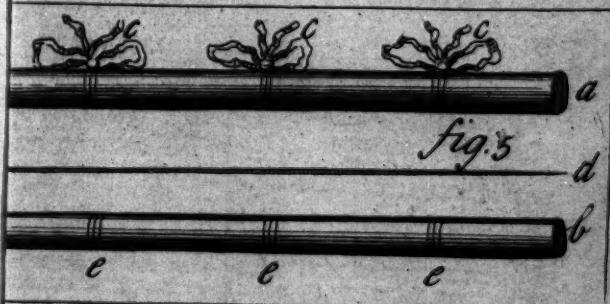
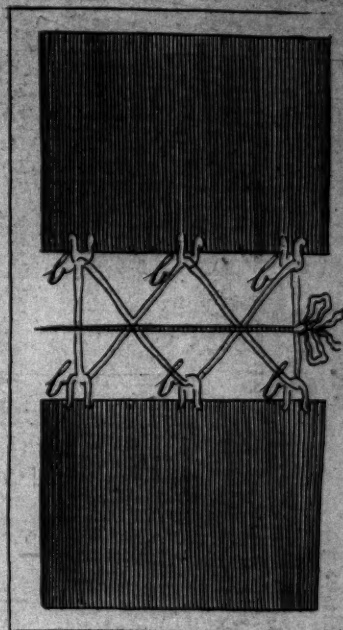


fig. 8

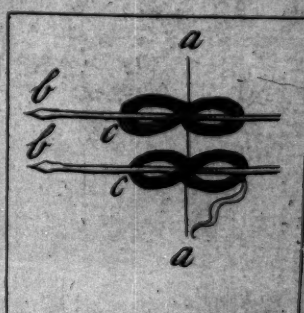


fig. 9

thread tied upon the roll of emplaster on the upper lip of the wound, while the other roll that lies upon the other lip of the wound is intercepted by the bow end of the threads *eee*.

Fig. 6. Represents the future of *Celsus* (*lib. 7. cap. 16.*) for performing the operation of Gastrophagia in wounds of the abdomen. But this method is at present out of practice, as it too much confines and inflames the lips of the wound; *aa* the stitches traversing each other, *b* the ends of the threads tied in a knot.

Fig. 7. Represents the glover's future, made for wounds of the intestines; *a* the thread, *bb* the wound of the intestine, *c* the beginning of the future, *d* the end of the future fastened by a knot.

Fig. 8, 9. Represent the twisted future made for uniting the hare-lip and other wounds, being made with one, two, three, or more needles, according to the length of the wound; *aa* the wound, *bb* the needle passed through the lips of the wound, *cc* the thread twisted round the needles.

T A B L E D.

Fig. 1. Is a steel instrument useful in various disorders of the skull; *a* denotes a small terebra for perforating the external table of the skull down to the diploe, *b* a screw to penetrate the bones of the skull, after a small opening has been made for it by the other point marked *a*, in order to raise a depression of the bones, *c* is an elevator for the same purpose.

U

Fig. 2.

Fig. 2. Represents the method of raising a depressed cranium in young children, by the use of a firm sticking plaster.

Fig. 3. Represents the tripode elevator of *Parey* and *Scultetus* for raising a depresseure of the cranium. This instrument is about as large again as the figure. The feet marked *aaa* may be brought nearer to, or removed farther from each other, by letting out or taking in the screws above. The feet of this instrument being applied to the sound part of a skull, the screw *bc* is then entered into the depressed bone, by turning round its handle *dd*, after an entrance has been first made into the bone for its point *b*, by the use of the triangular point of the instrument marked *a* *Fig. 1.* Having once entered the screw *b*, it is then raised by degrees together with the depressed bone, by turning round the female screw *ee*. But if any fissure or opening appears betwixt the fractured or depressed skull, in that case the screw *b* may be taken off, and the elevator marked *g* may be fastened on by the screw *b*, at the part of the instrument marked *f*; after which by turning round the female screw *ee*, the depressed bone will be raised as before.

Fig. 4. Shews the manner in which the preceding instrument is applied to the head.

Fig. 5. Represents the elevator of *Hildanus* (*cent. 2. obj. 14.*) for raising a depression of the skull, which is much more simple and equally convenient for the purpose with the former. You are to be provided with the screw *a*, and with the hook, *Fig. 6*; through either of which the lever marked

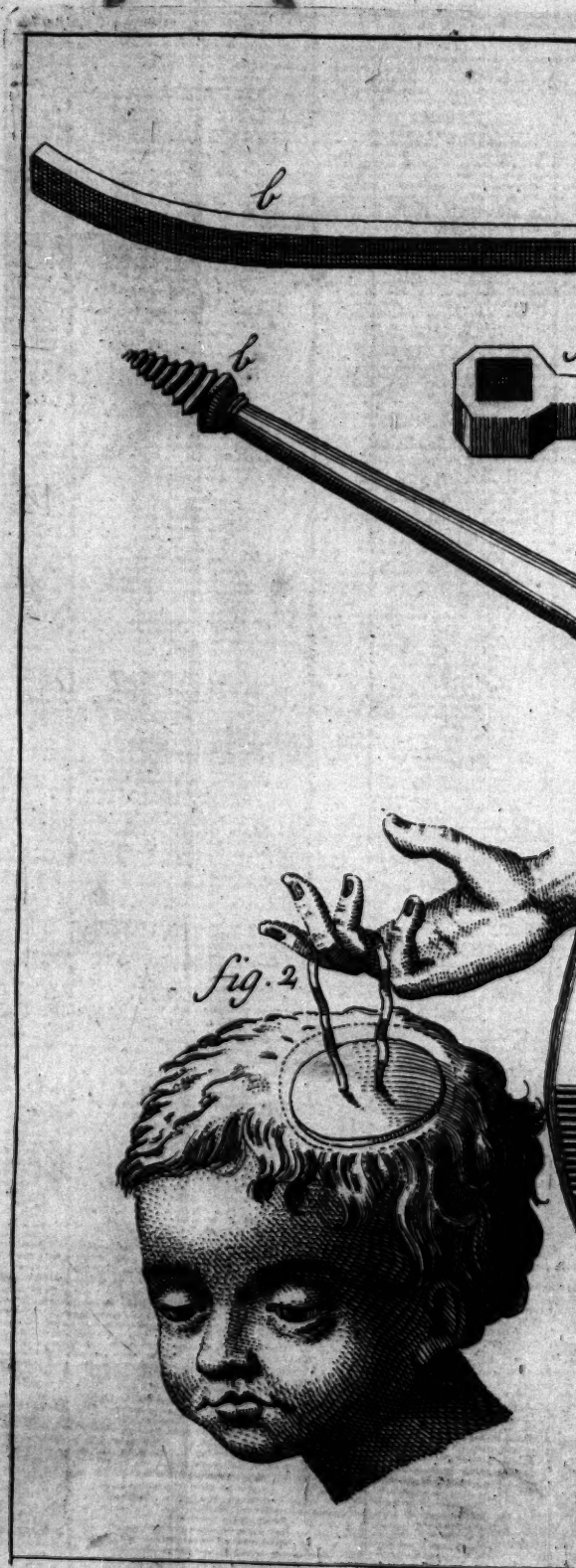
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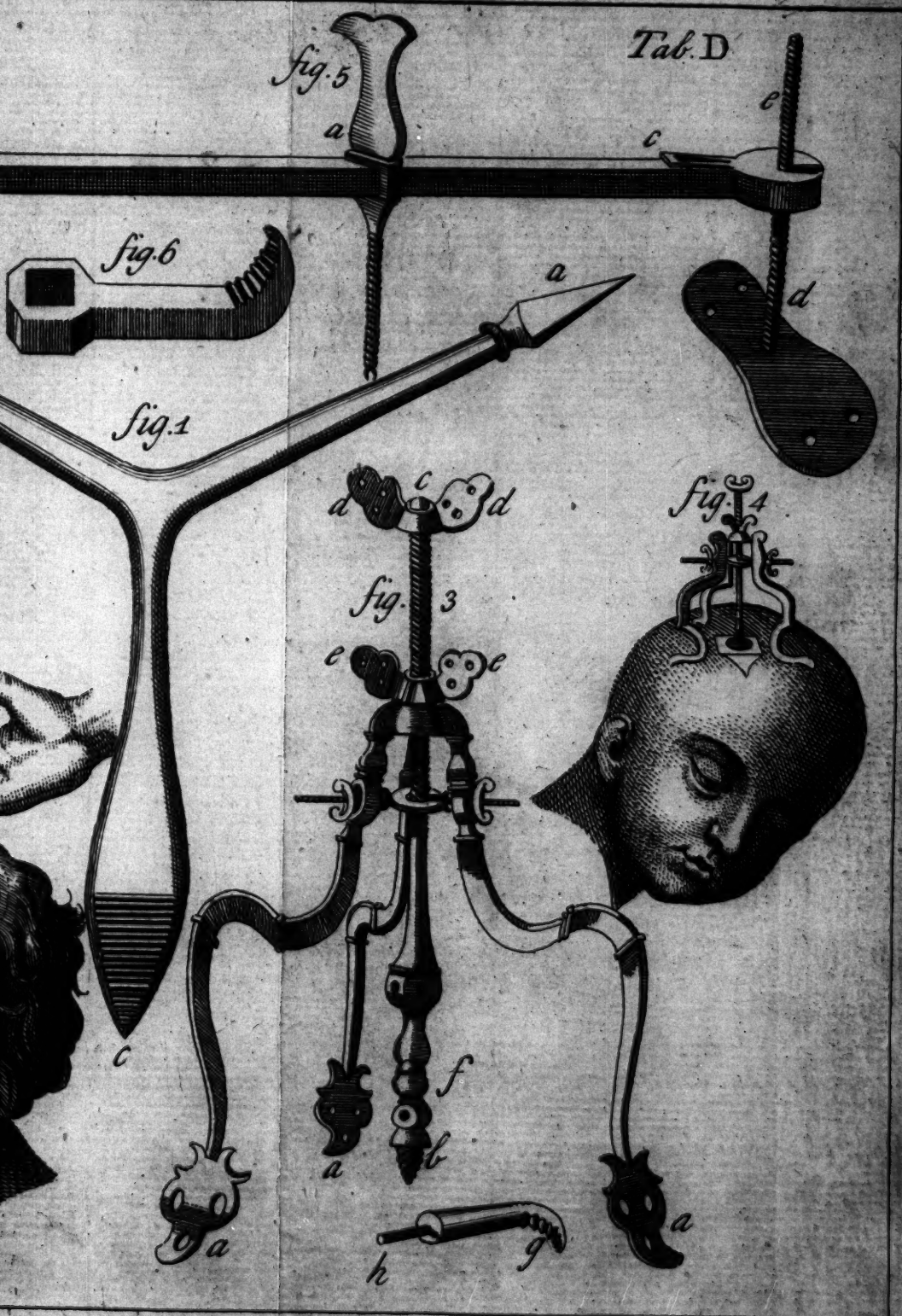
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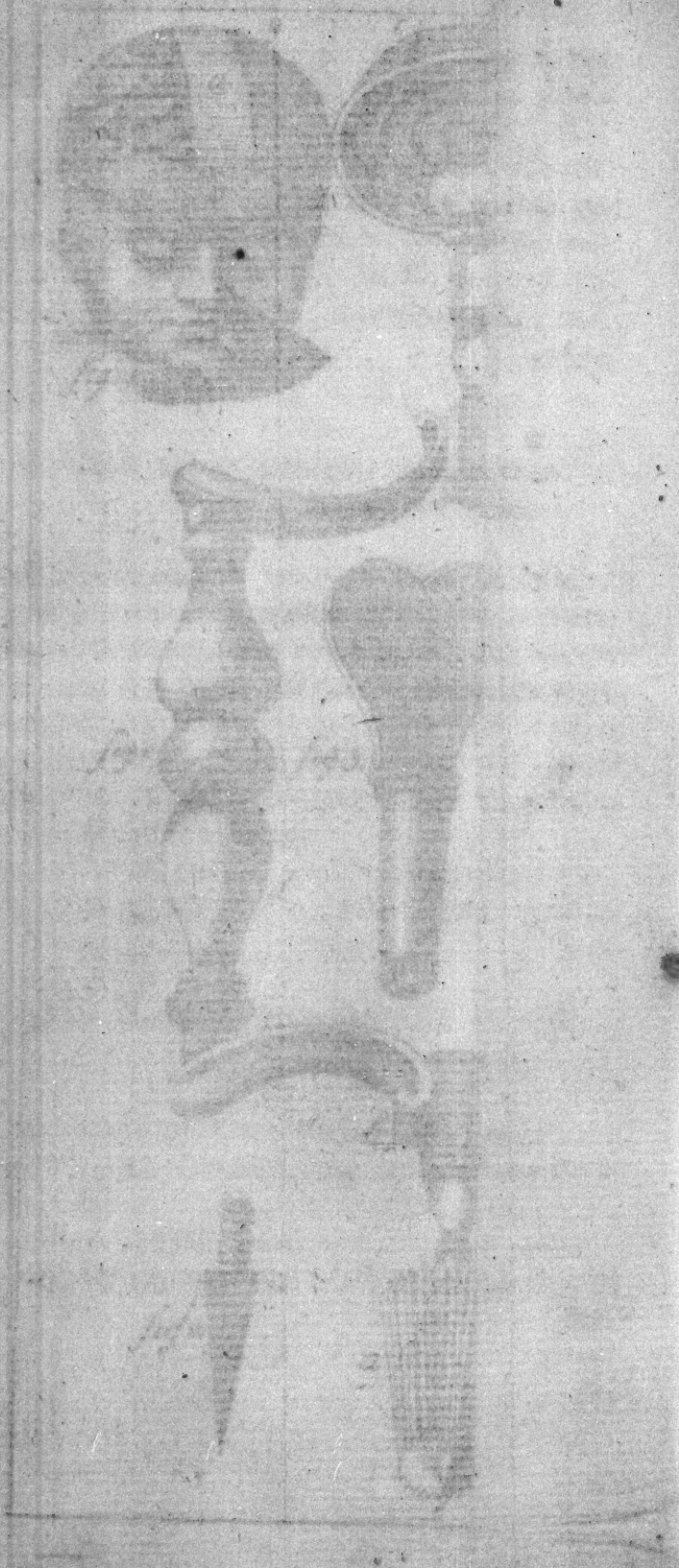












marked *bc* may be passed, after the screw or hook is properly fixed upon the depressed bone. The plate *d* being placed upon a sound part of the head with a linnen compress under it; then by raising the end of the lever marked *b*, which may be raised or depressed at its other end by the screw *e*, the hook *Fig. 6.* or the screw *a*, is by that means elevated together with the depressed bone.

T A B L E E.

Contains the instruments for the operation of trepanning the skull.

Fig. 1. The modern trepan; *a* denotes the crown, *b* the part where the crown is forewed on to the handle, *cc* the upper moveable part of the handle, upon which the hand or chin is pressed in the operation, *d* the arch of the handle by which the instrument is turned round, *e* the pyramid or spindle of the crown, by which it is kept from moving out of the circle of the bone, unless the teeth of the crown have entered sufficiently deep, after which the spindle is taken out.

Fig. 2. The pyramid or spindle taken out of the crown.

Fig. 3. Is a key or winch by which the spindle is taken hold of, and screwed into the crown.

Fig. 4. Is a lenticular scalpel to smooth the rough edges of the bone after the use of the trepan.

U 2

Fig. 5.

Fig. 5. Is a steel depressor or meningophylax to press down the dura mater, and discharge the confined blood.

Fig. 6. Is a sort of terebra to be fastened to the handle of the trepan after taking off the crown, serving to make the first entrance for the spindle of the trepan, as also to perforate a bone in a spina ventosa, whence it is also called the perforating trepan.

Fig. 7. Is a hair-brush to cleanse the teeth of the crown of the trepan from the saw-dust.

Fig. 8. Is an exfoliating trepan, sometimes used to pare away a carious part of a bone. *a* the point which keeps it fixed in the bone, *bb* the wings which scrape the bone when the instrument is turned round.

Fig. 9. A dossil of lint secured by a thread for the dressing after trepanning.

Fig. 10. Is a pledgit or round compress of scraped lint secured with a thread.

Fig. 11. Is another pledgit of lint without a thread, to fill the aperture of the cranium.

Fig. 12. Is a leaden plate of *Belloste*, perforated with small holes, to be applied in order to make a resistance upon the brain, and prevent a fungus.

Fig. 13. Represents the manner in which the handles of the aforesaid leaden plate are to be bent, in order to adapt themselves to the opening of the skull.

Fig. 14.

Tab. F

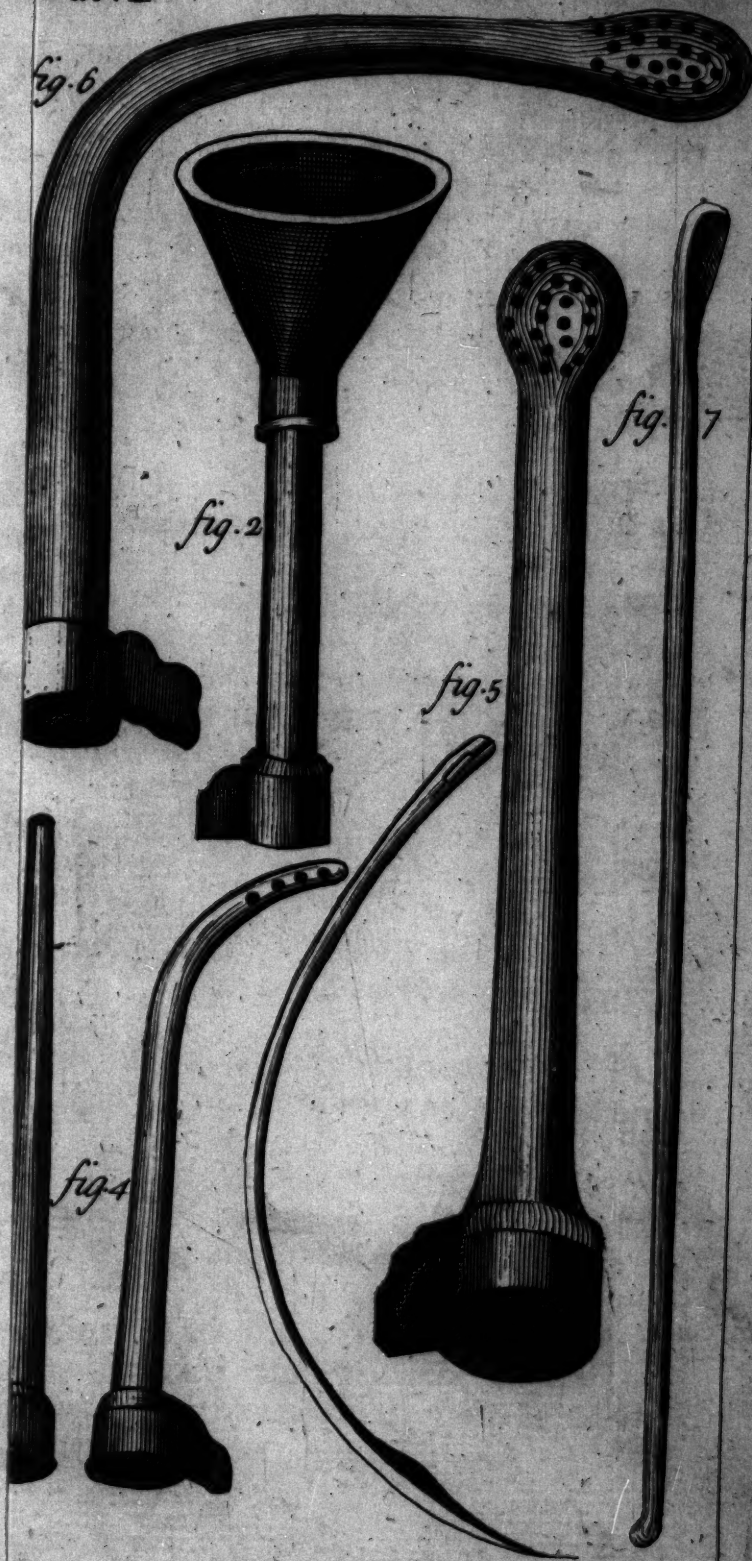


fig. 1



Tab. F

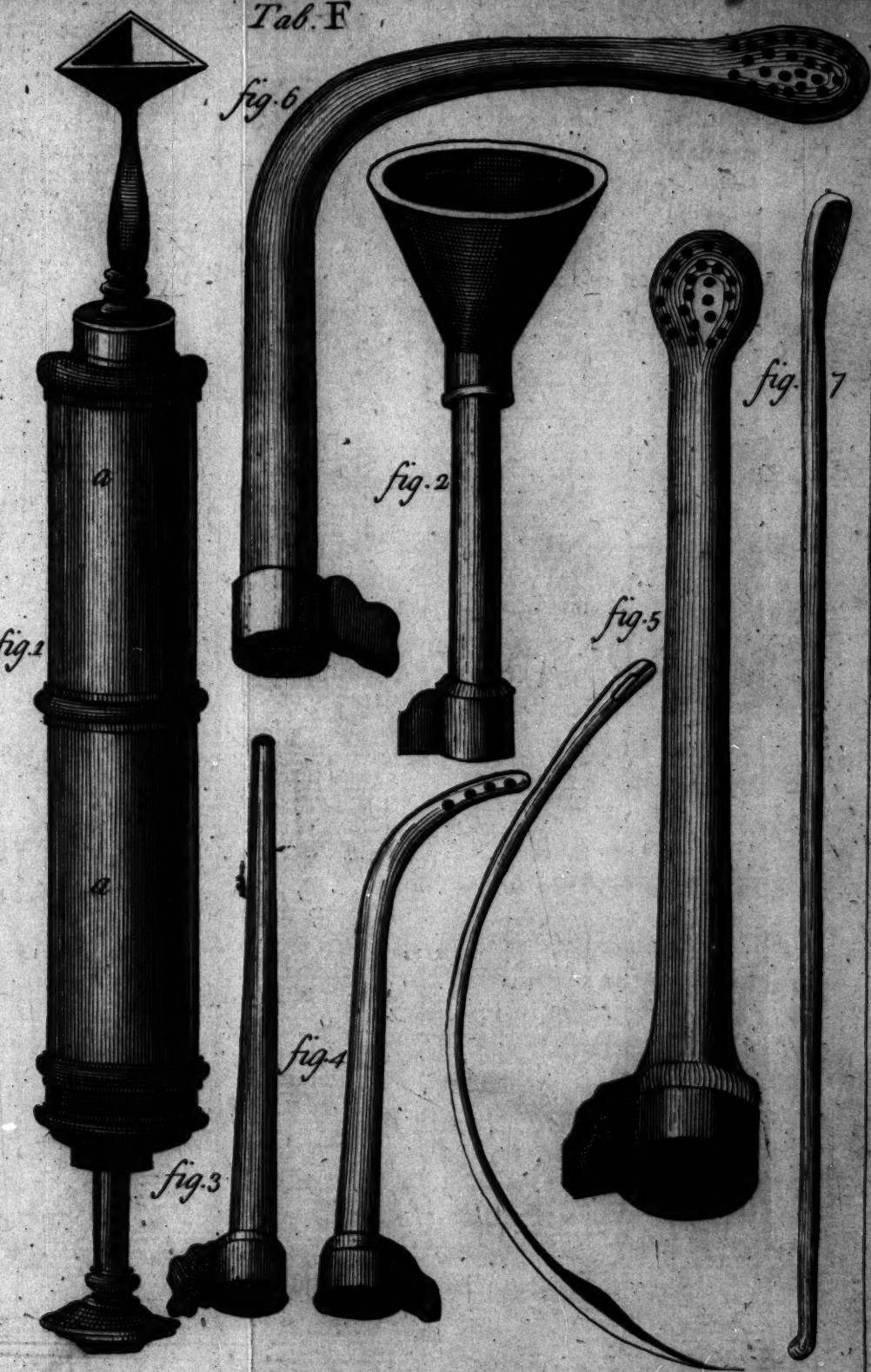


Fig. 14. Represents the capeline bandage to retain the dressings after the operation of trepanning, described *Q. 131.*

T A B L E F.

A Syringe furnished with several pipes for injecting liquors into the thorax or abdomen, and for drawing extravasated blood out from thence.

Fig. 1. The syringe, which will not only serve to inject liquors in wounds of the thorax and abdomen, but likewise into the fauces, ulcers, and uterus, &c. and this will also serve to extract blood or matter from the cavity of the thorax.

Fig. 2, 3. Are pipes to be screwed on to the syringe *a a* *Fig. 1.* for various uses.

Fig. 4. Is a curved pipe with holes in its extremity, for extracting blood, matter, or injected liquors out of the thorax.

Fig. 5, 6. Are pipes perforated like a cullender, for conveying injections from the syringe, the latter being calculated for uterine injections.

Fig. 7. A kind of probe with an excavation at one extremity like an ear-pick, and serving for various uses in wounds of the thorax and other parts.

T A B L E G.

Represents the instruments serving to lay open sinusses and fistulæ by incision, particularly those of the anus.

U 3

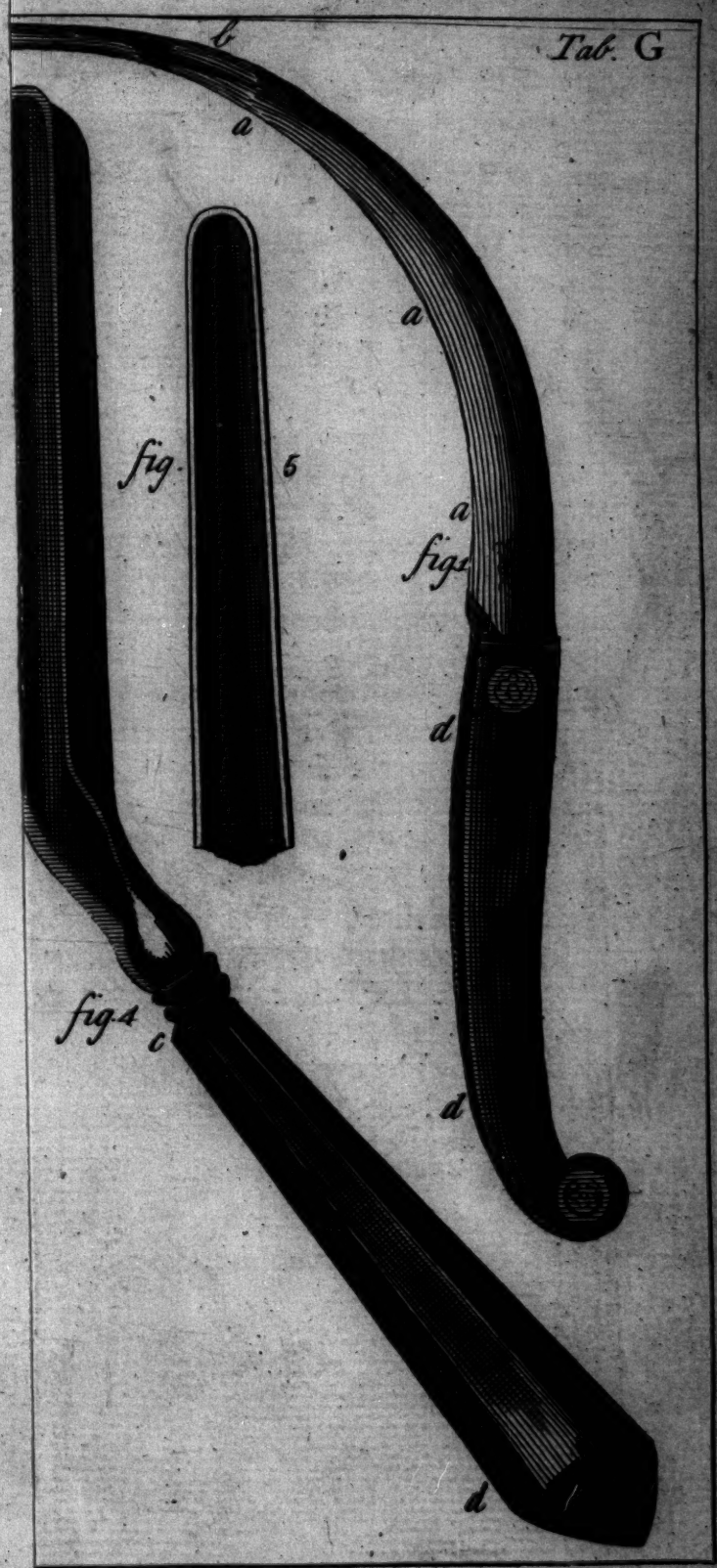
Fig. 1.

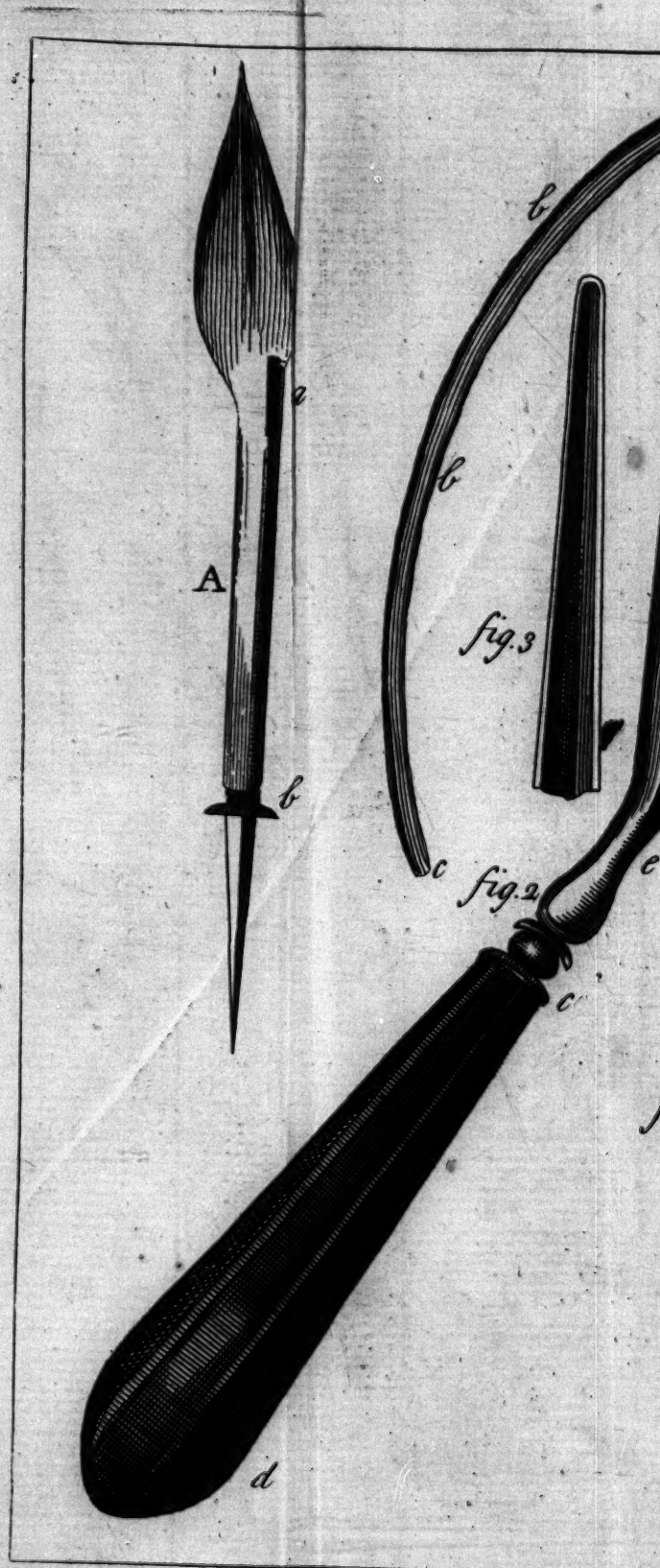
Fig. 1. Is one of the most convenient and useful of the modern syringotomi or scalpels for opening fistulæ of the anus, invented and published by *Bassius*. *aaa* denote the edge of this falciform scalpel, *bb* the flexible probe-end made of silver, *c* the point or end of the probe, *dd* the handle in which the edge of the scalpel *aaa* is concealed.

Fig. 2, 3, 4, 5, 6. Represent the instruments recommended for opening fistulæ by *Rungius*, a surgeon of *Bremen*. *Fig. 2.* *ab* a grooved probe or director, *cd* the handle, *e* the part where the director is usually bent according to the course of the fistula. *Fig. 3.* gives a direct view of the groove in the director, as the preceding gave an oblique view. *Fig. 4.* *ab* represents a cannula to be passed into the anus for the reception of the edge of the knife, marked *Fig. 6.* that it may not hinder the adjacent parts in cutting the fistula, *cd* its handle inclined to the opposite side. *Fig. 5.* Represents a direct view of the cavity in this cannula, that its diameter may be the better discerned. *Fig. 6.* Represents a long and narrow scalpel, which in cutting for a fistula is conducted through the groove of the director, *Fig. 2.* into the cavity of the cannula, *Fig. 4.*

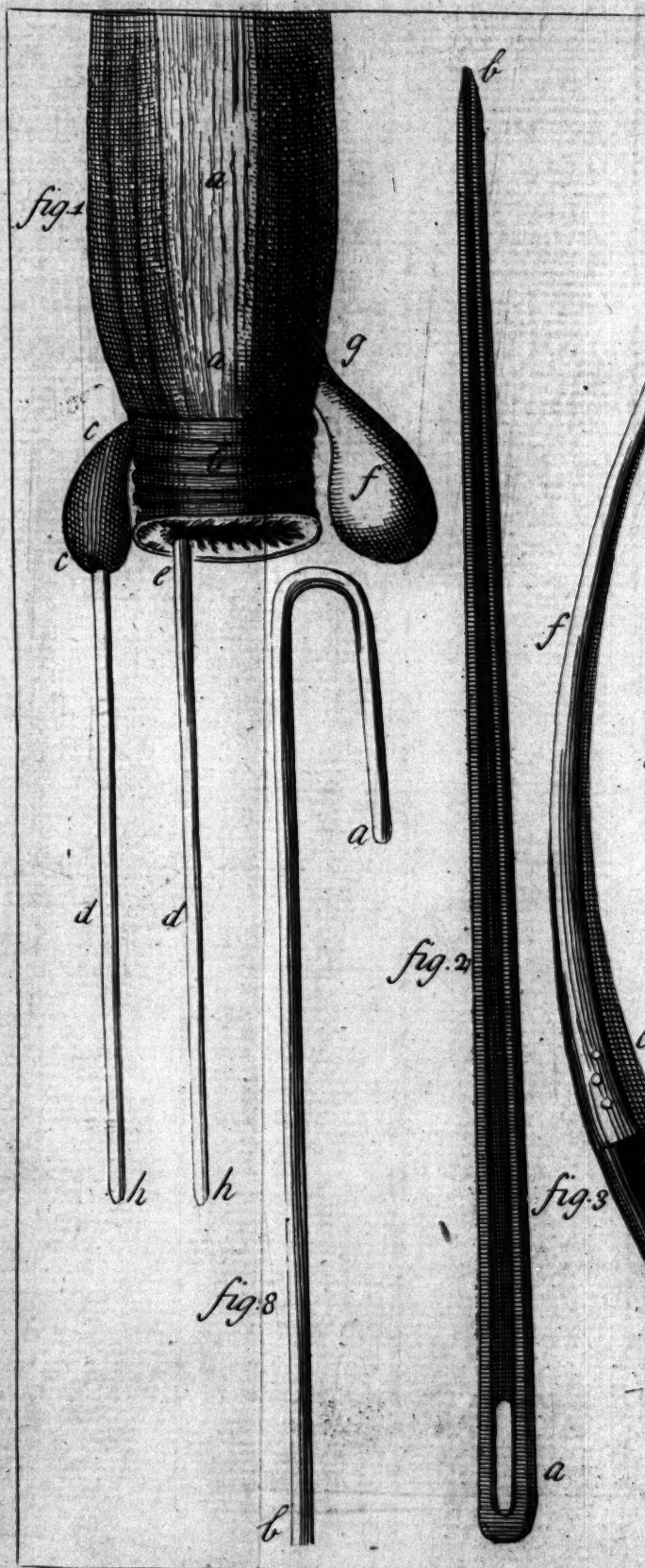
Fig. A. Represents a seton needle, the point of which is shaped like a lancet; *a* the eye of the needle, *b* the part which is to be fixed in a handle.

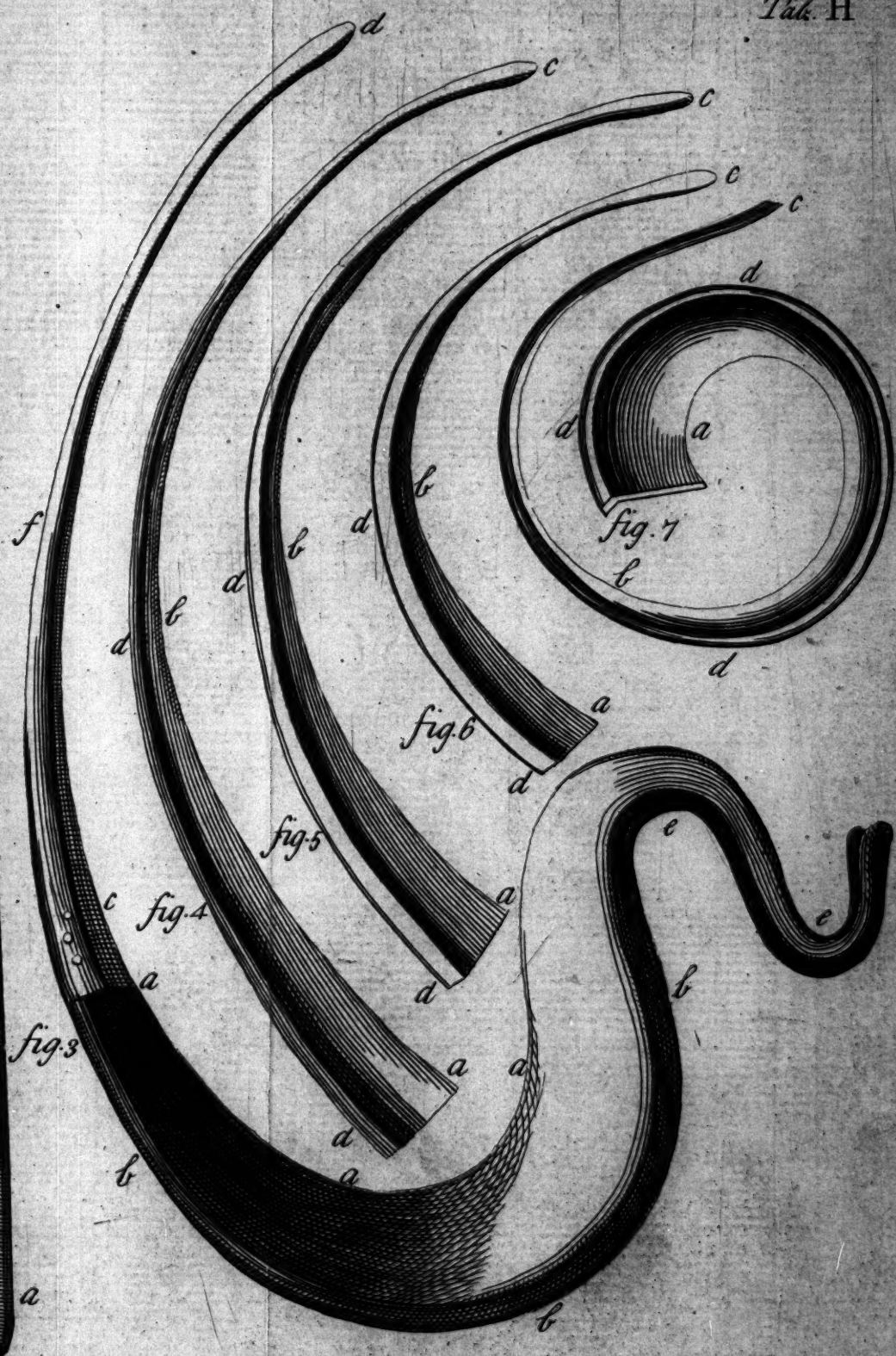
TABLE











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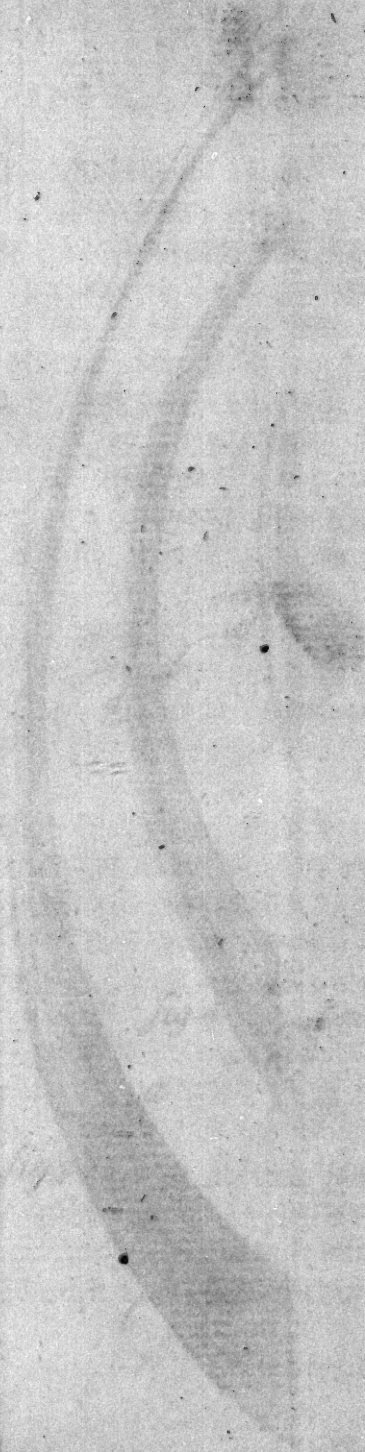
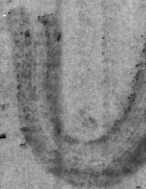
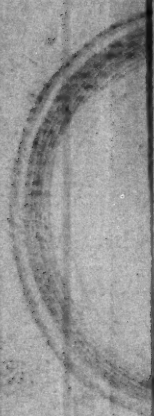


TABLE H.

Relating to fistulæ of the anus.

Fig. 1. Represents the two species of fistulæ in the anus, the one opening into the rectum only, and the other opening outwards as well as into the rectum; *aa* denotes part of the intestinum rectum, *b* the sphincter of the anus, *cc* a perfect or compleat fistula ani, terminating with one aperture externally, and the other in the intestine; *dd* a flexible probe, or silver wire, passed through the two orifices of the fistula, and bent so as to come through the anus *e*; the two sides of the wire, intercepting the fleshy parts to be divided, are drawn gently outward, for the more safe and convenient performance of incision; *f* represents an imperfect or incompleat fistula, having only the orifice *g* opening into the intestine; *bb* denote the two extremities or heads of the silver wire.

Fig. 2. Represents an instrument like a large needle, from *Garengeot*, made of flexible silver, having an eye marked *a* for the transmission of a ligature, when any one would by that means divide the parts, according to the advice of the ancients; and it may also serve to convey a slip of linnen through a wound or ulcer in the manner of a seton: *b* the point of the instrument, which is to perforate the intestine in an incomplete fistula, and then to be inflected and brought out through the anus; it has a groove running through its whole length, by which it may serve to guide the knife instead of a director.

Fig. 3. Is a kind of syringotomus taken in part from *Garengot's* treatise on instruments (*Tom. I. p. 337.*) *aaa* denotes the concave and sharp-edged part for cutting, *bbb* its convex back which is obtuse, *cd* the silver wire or probe end, which is flexible and beginning at the letter *c*, terminates at the point *d*; the part marked *ee* being bent in form of a hook, serves as a handle to facilitate the cutting of a fistula when it is very hard and callous; *f* denotes where the instrument terminates, without the part *df*, by which means it more commodiously performs its office, than if it were of the whole length here represented.

Fig. 4, 5, 6, 7. Represent several common syringotomi of the ancients, of different sizes and curvatures, and furnished either with obtuse or sharp points, according to the different circumstances of fistulæ; in these the part which cuts is marked *ab*, *c* the probe end, *dd* the convex and obtuse back.

Fig. 8. Denotes a flexible silver probe or wire bent in such a manner, that the part *a* being introduced through the orifices of the fistula, and brought towards the other end, a space is formed for intercepting and extending the parts of the fistula to be incised.

T A B L E I.

Fig. 1. A pair of large forceps or cutting-pincers to take off splinters or fragments of bones; but they will cut easier provided the handles are made two or three inches longer than the figure.

Fig. 2.

Tab. I



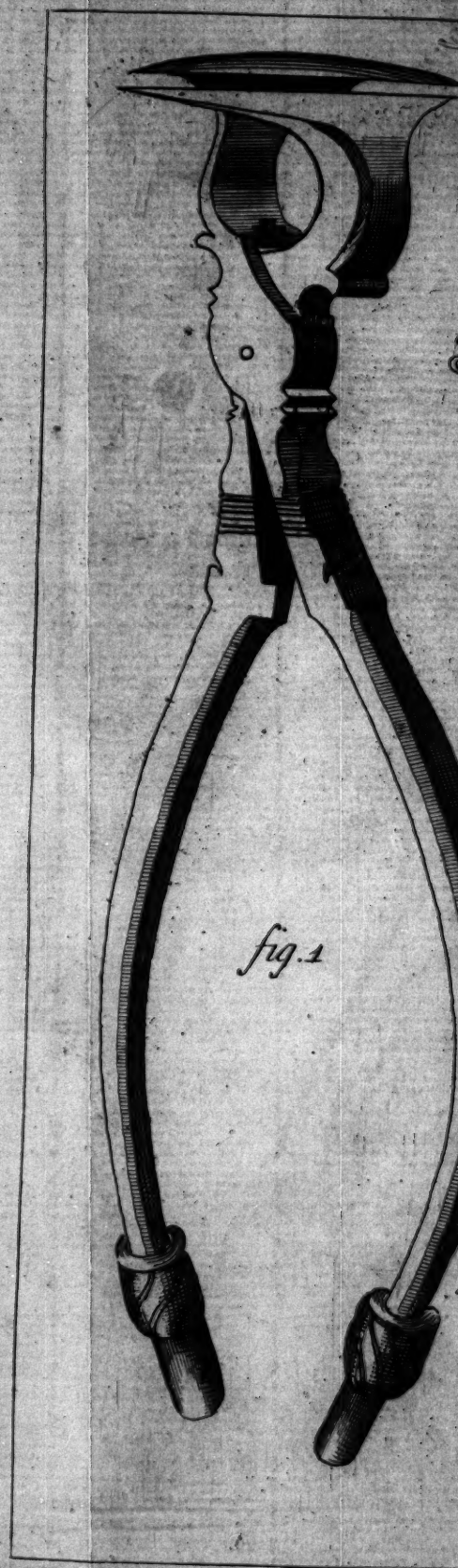


fig. 3

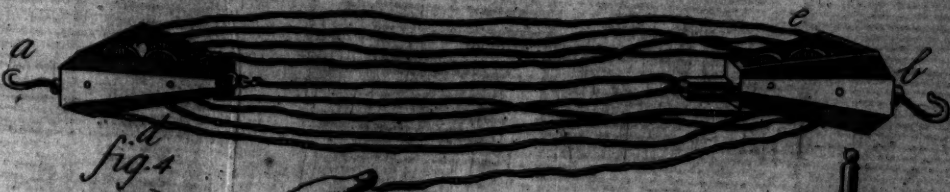
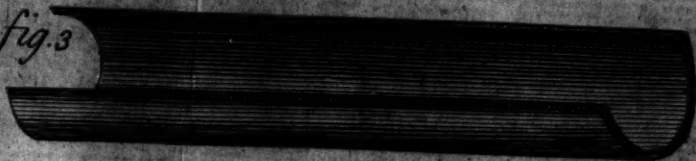


fig. 4

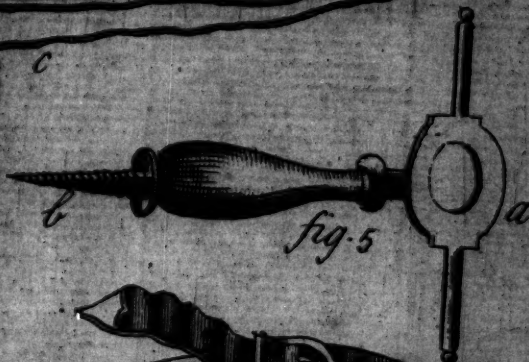
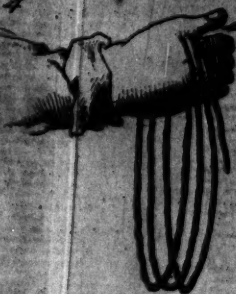


fig. 5



fig. 6

fig. 2

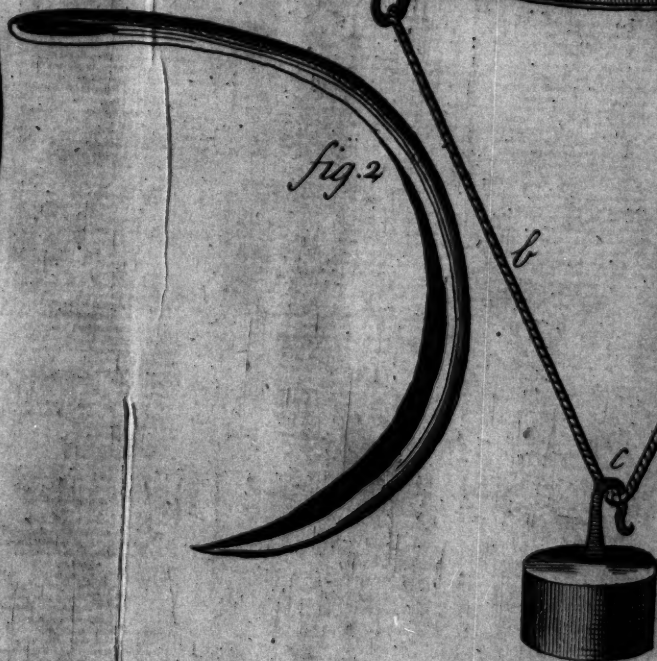


fig. 1



Fig. 1

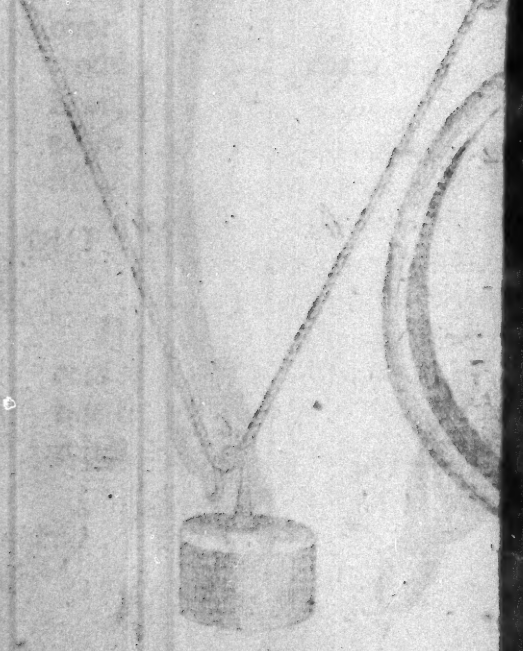
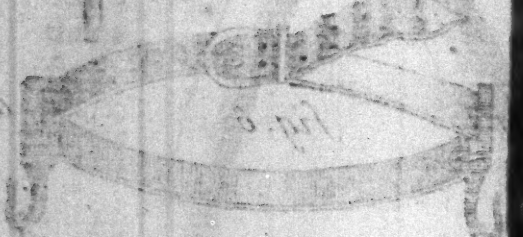
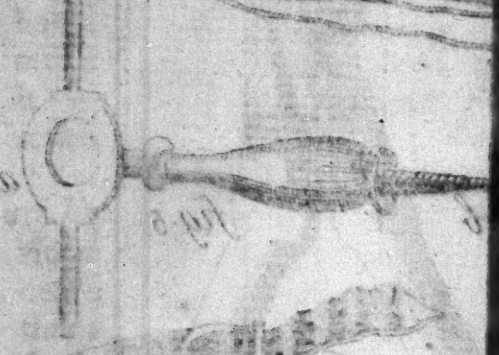
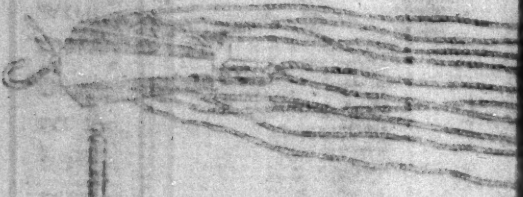


Fig. 2. Is a large crooked needle serving to pass ligatures under wounded vessels, in order to constrict them; and if it be made proportionably larger, it may serve to convey ligatures under a cancerous breast, in order to elevate the same in extirpation.

Fig. 3. Represents a pasteboard case, in which a fractured arm is to be lodged, after it has been set and dressed. The size of this is to be adapted to that of the limb.

Fig. 4. Is a polyspaston or compound pulley used to extend fractures, when the strength of the hands is not sufficient. *ab* are two hooks by which the instrument is fastened one way to the screw, *Fig. 5.* fixed in some post or beam, and the other way to the middle of the rope *c*, belonging to the belt, *Fig. 6.* fastened round the limb; *c* the rope, by drawing which an extension is made upon the broken limb; *de* are the two pullies consisting of several wheels, by which the force of the drawer is very much increased; so that the greater the number of wheels over which the rope passes, the more easily and gradually may the extension be made, insomuch that by this means one man may exert a greater force than ten. This instrument is more particularly useful to make an extension in fractures of the thigh-bone, because there the muscles are so large and strong, that their force cannot be easily overcome by an extension of the hands only.

Fig. 5. Is a strong iron screw, whose worm *b* is to be forced by the two handles into some post
or

or beam, in order to fasten the hook *b* of the preceding pulley upon the ring *a*.

Fig. 6. Represents the girt of *Hildanus* to be fastened round the lower part of the limb, in order to make an extension, either by pulling with the hands with a napkin, or by appending the weight *c*, or else by applying the polyspaston before described, instead of the weight *c*; *a a* two hooks through which the girt is past, upon which hooks is hung the sling or rope *bb*; *c* the place where the extending force is applied.

T A B L E K.

Fig. 1. Represents the foliated bandage to be applied in compound fractures. This bandage consists of eighteen leaves, nine on each side, the innermost being shorter than the rest. These leaves are applied obliquely over each other, those in the middle first, and afterwards those at each end.

Fig. 2. Represents the machine commonly called the ambe of *Hippocrates*, formerly much used for reducing dislocations of the humerus; it consists of the fulcrum *a a*, to which is fastened the moveable lever *bc*, joined to each other by a sort of moveable articulation *d*. In using this instrument, the dislocated arm is fastened to the lever *bc*, by inclining which the arm is at the same time extended, while the head of the humerus is thrust into its place by the end *c*.

Fig. 3. Is a machine contrived by M. *Petite*, for reducing luxations of the humerus, and of other

Tab. K

a



f



fig. c



e

c

fig. 6

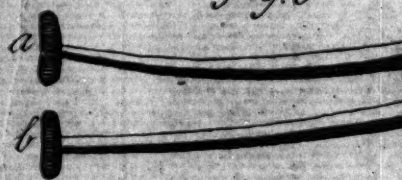


fig. 1

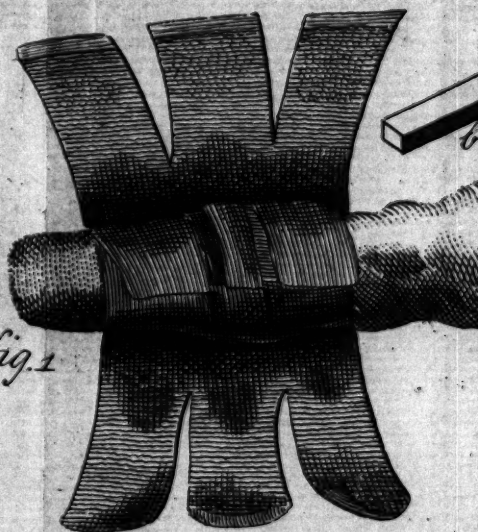
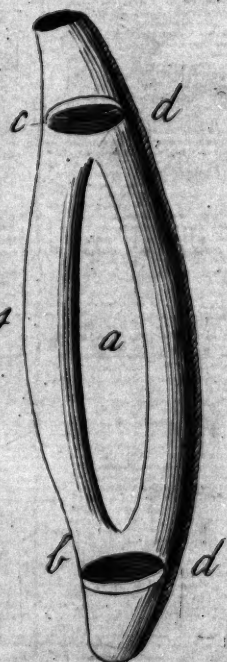


fig. 4



2.6

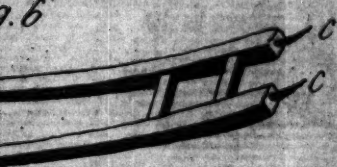
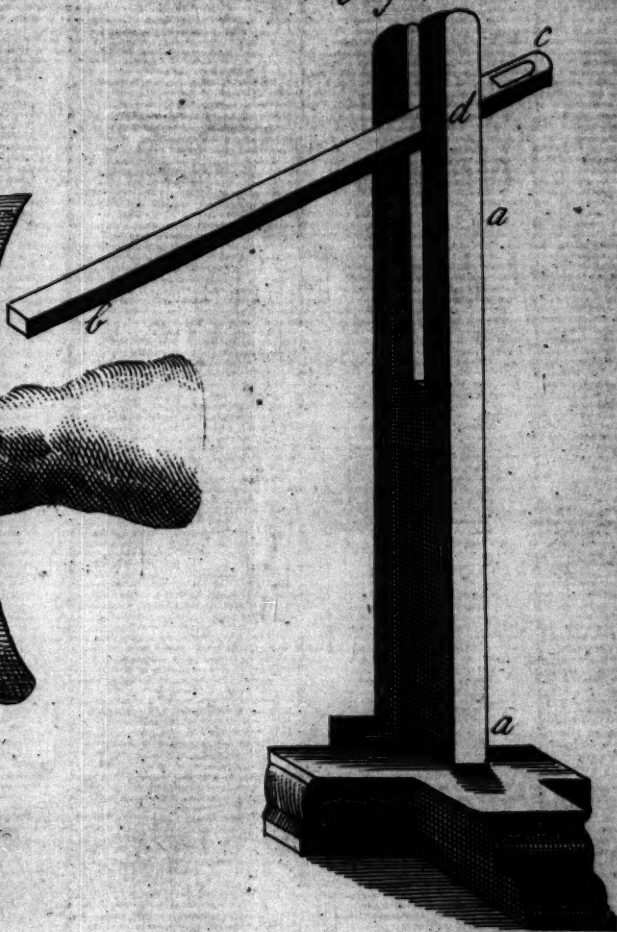


fig. 2



Tab. K
fig. 3

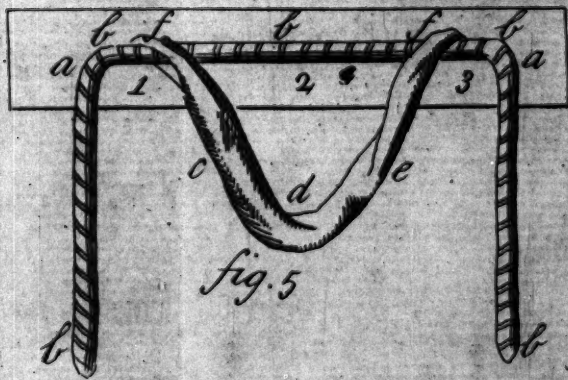
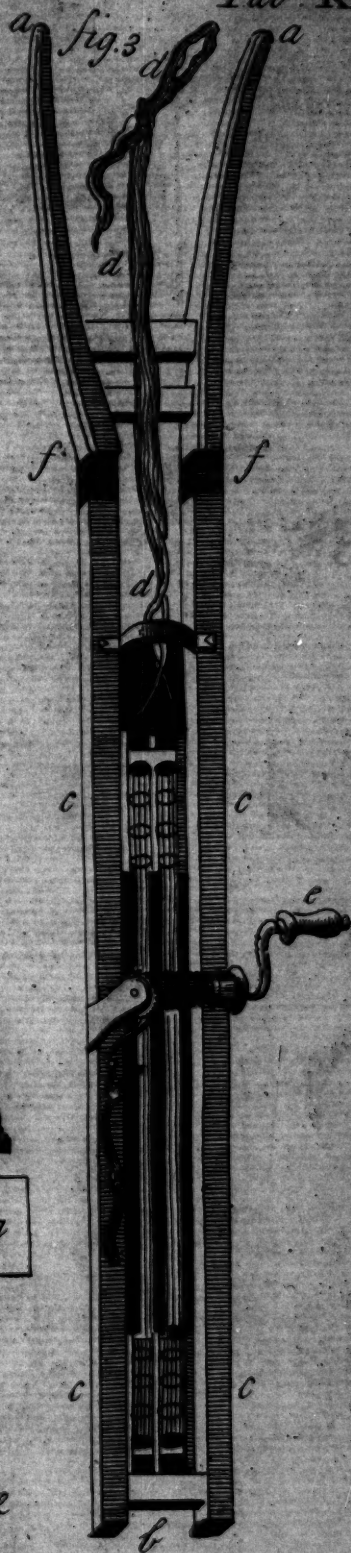
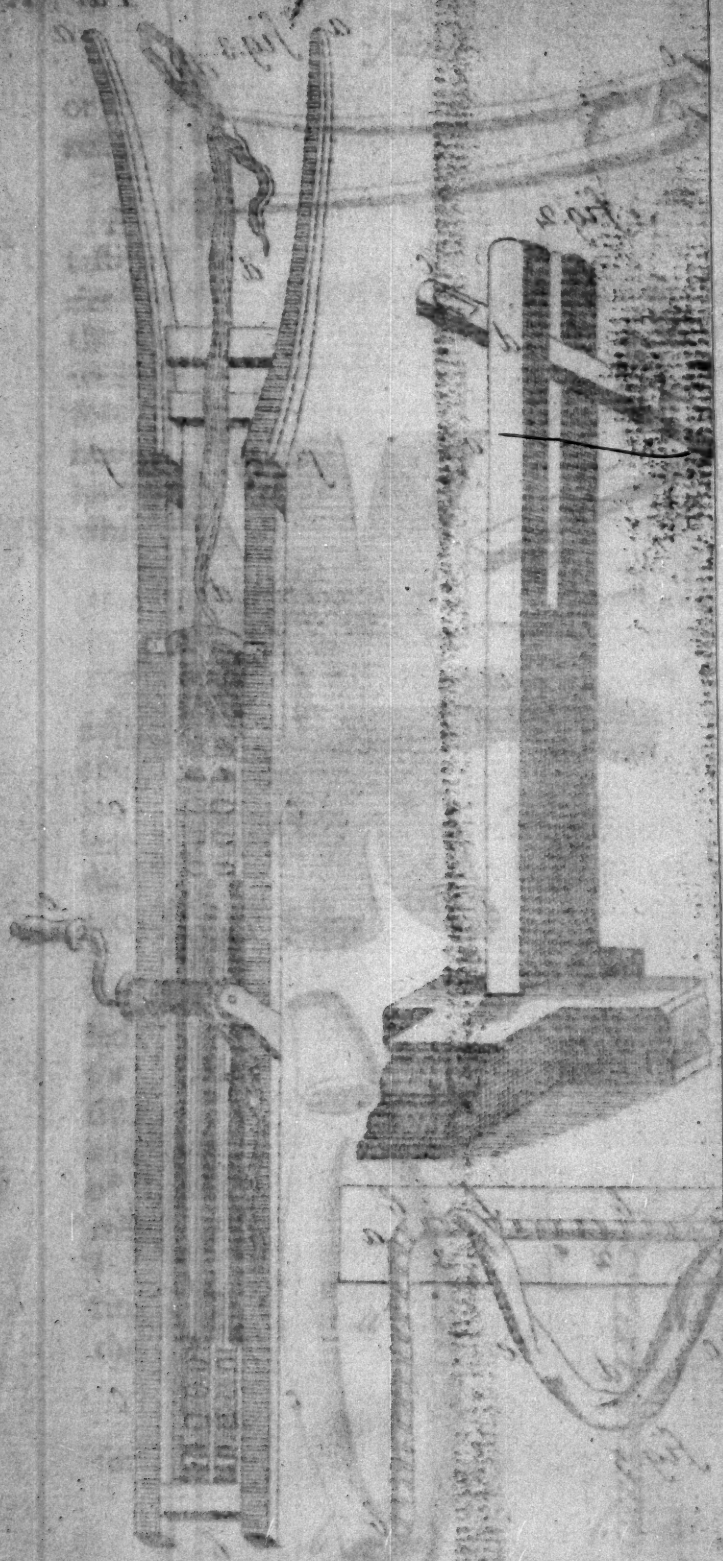


fig. 5

100



other joints ; *aa* represent two arms, by which the patient, and particularly the scapula, is held firm from giving way in the extension ; *b* the other end of the instrument resting upon the ground or floor ; *cc* pulleys of the machine, *dd* the rope, by winding up which an extension is made ; *e* the handle, by turning which the rope is drawn tight, and extends the limb ; *ff* the part where the two horns are joined to the body of the machine.

Fig. 4. Denotes a retinaculum or supporter to be used in luxations of the humerus. *a* an opening or slit in the machine, which is made of strong ticken lined with leather ; *bc* the shape of it at each end, *dd* two apertures through which the two legs or horns *aa* of the preceding instrument are transmitted.

Fig. 5. Represents a particular sling of *M. Petite*, proper to extend luxated limbs. *aa* the part made with leather, *bbb* a filken ligature sown to the leather in three places, at 1, 2, 3 ; the part *aa* is fastened round the arm ; *cde* is a strong loop fastened to the filken ligature at *ff*, so as to be moveable.

Fig. 6. Is an instrument recommended by *M. Petite* for the reduction of a luxated femur when it is dislocated forward. It is fastened at *ff* into the machine *Fig. 3.* instead of the two arms *aa* ; the head *a* is applied to the os ilium, and the other *b* to the middle of the thigh ; but *cc* are fixed into the machine at *ff*, *Fig. 3.*

By

By this contrivance of *Petite* there is a counter extension made at the same time, to retain the patient while the limb is extended. Thus for the reduction of a dislocated humerus, the arm is first put through the opening *a* of the machine, *Fig. 4.* so as to make one end *b* come over the breast, and the other end *c* across the back, while the two holes *dd* transmit the two legs *aa* of the machine, *Fig. 3.* while the other end of the machine *b* is lodged upon the ground. In this machine there are several pullies *cc, cc,* as in the polyspaston of *Tab. I.* round which pullies passes the rope *dd* wound up by a handle *e.* But that the arm may be better extended, he uses a peculiar sling *aa, Fig. 5.* made of soft and double leather, fourteen inches long; this he fastens strongly round the lower part of the os humeri, a little above the elbow, the skin being first pulled upwards: it is to be kept firm upon the limb by the means of a silken cord, three quarters of an ell long, sewed in a particular manner to the leather of the sling, and to be fastened by a knot at the two ends *bb:* to this silken cord is fastened another sling *cde,* by two moveable loops *ff,* to which is to be annexed the rope *ddd,* which passes round the pullies of the machine. The apparatus being all rightly fitted, the assistant is order'd to wind up the rope by the handle *e, Fig. 3.* the rope becomes by that means stretched, and the arm to which it is fastened is gradually extended. In the mean time the surgeon directs the head of the humerus with his hands, that it may again obtain its natural place, which it very often does of its own accord without further assistance.

But

fig. 1



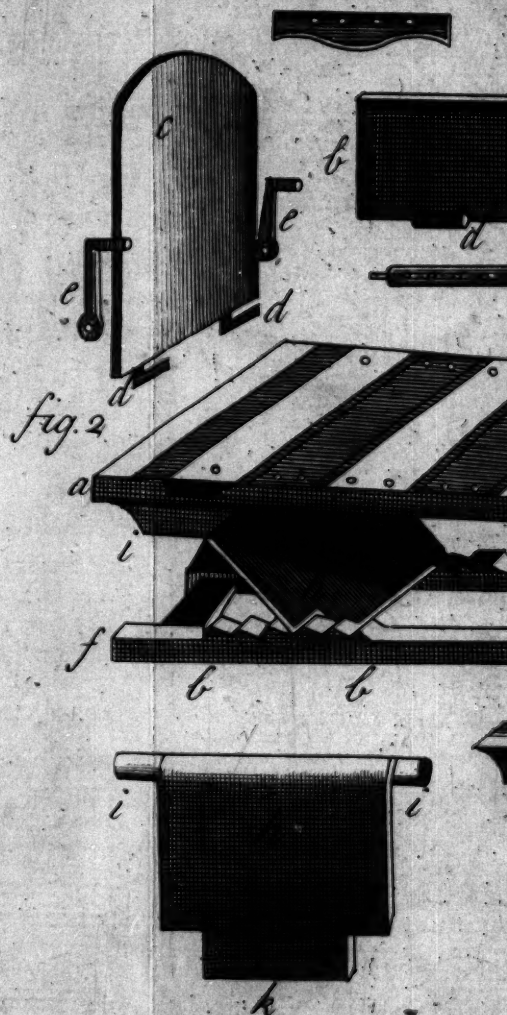
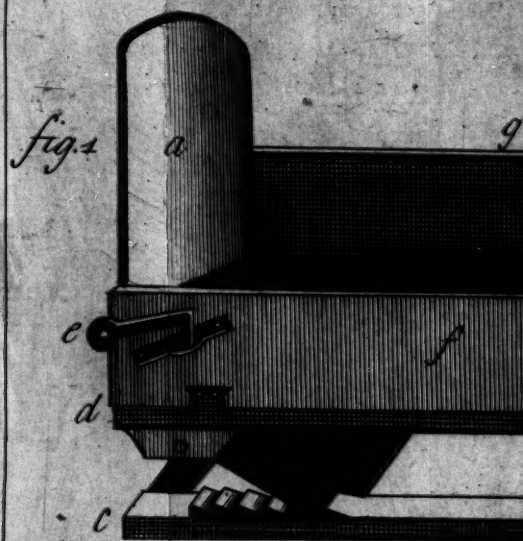
fig. 2



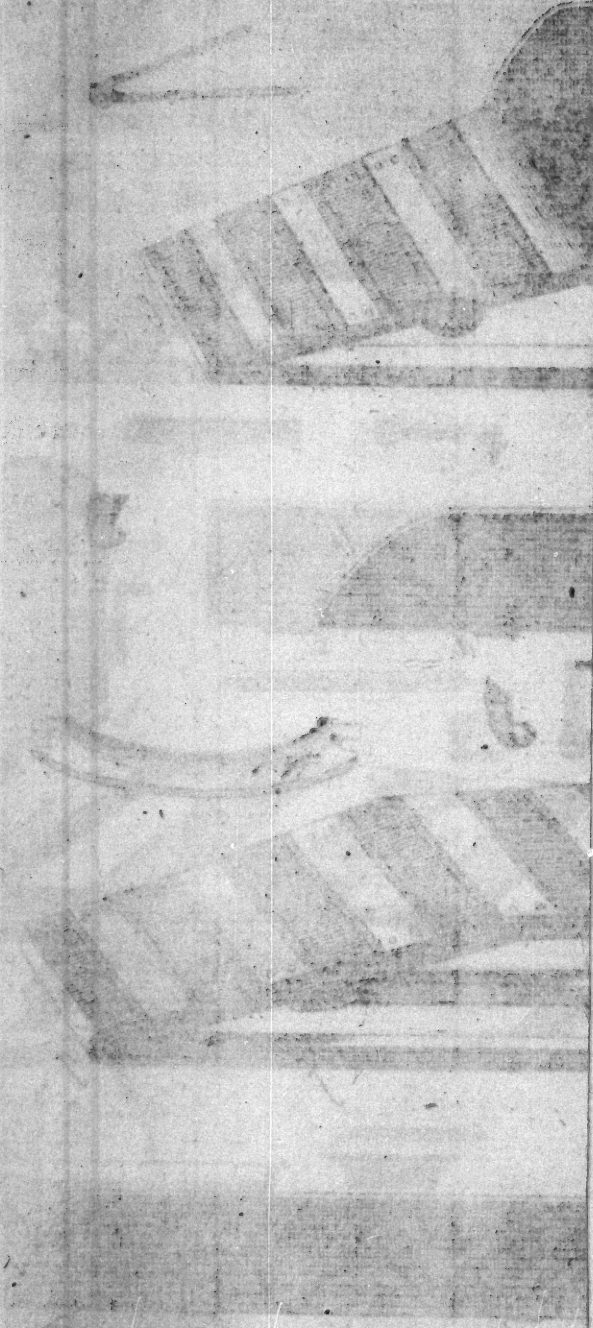
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But to apply this machine for reducing a dislocation of the thigh forward and downward, or backward and upward, the support *Fig. 4.* is not required to be so broad, and it may be made without the opening *a*, as the thigh is not to be transmitted through it; but the middle thereof is to be applied to the tubercle of the ischium, one end being folded behind, and the other before. The patient is to be placed on his sound side, that the luxated thigh may lie upwards; but the machine itself is to be placed between the thighs, the knee of the distorted side being a little bent. The sling, *Fig. 5.* is to be fastened firmly round the lower head of the thigh above the knee, the skin being first drawn tight upwards, as we advised before in a luxation of the humerus; it is then to be firmly fastened to the rope *dd* passing round the wheels *cc* of the machine, *Fig. 3. dd.* And lastly, the legs or horns of the machine *aa*, are to be put through the apertures in the retinaculum *dd*, *Fig. 4.* and by winding up the rope by the hand *e*, *Fig. 3.* it is to be gradually extended, till the surgeon perceives by the limb that it is sufficient.

T A B L E L.

Represents the fracture-box of *M. Petite*, a celebrated surgeon of *Paris*, described and published by him in *Mem. Acad. Reg. Paris; Anno 1718.* described in *Q. 179.*

T A B L E M.

Fig. 1. Represents a cupping-glass.

Fig. 2.

Fig. 2. A scalpel or single scarificator, much used in *Germany*, but not among us. *a* the handle, *b* the edge, *c* the part which is struck very quick with the end of the finger to wound the skin.

Fig. 3. Represents the order or position of the incisions made in the skin by the cupper, that they may be all of them intercepted by the cupping-glass, *Fig. 1.*

Fig. 4. Exhibits the modern scarificator now universally used, makes sixteen incisions in the skin with little pain, by one stroke in the order of *Fig. 3.*

Fig. 5. Represents a pair of pliers for pinching up the skin in the neck in order to make a seton, by passing the seton needle marked *a*, *Tab. G.* through the opening of the pliers *b*, which are held fast upon the skin by the gripe *a*.

Fig. 6. Represents another pair of pliers, for the same use.

Fig. 7. Represents the manner of securing a fractured arm with splints and compresses *aaa*, tied over the bandage by the strings *bbb*; with knots on the outside of the arm, and suspended by the sling or napkin about the neck *ccc* tied in a knot upon the shoulder *d*, and sustaining the pasteboard case *e*, for a fracture of the cubitus, this last being unnecessary in a fracture of the humerus.

Fig. 8. Represents a straw case, with the manner of fixing it to a fractured leg: *aaa* denote

two

fig. 3

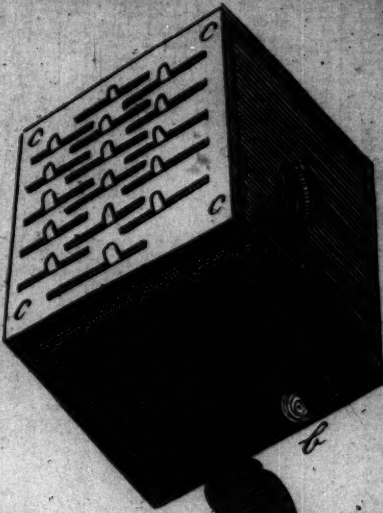
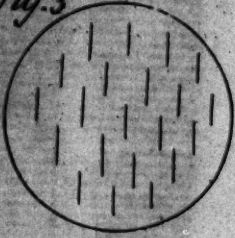


fig. 4

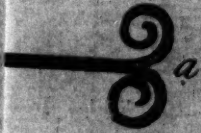


fig. 5

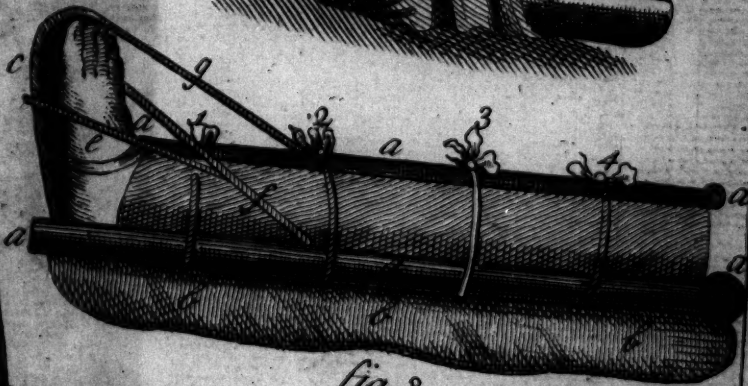


fig. 8



fig 1

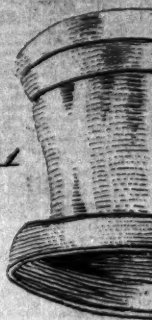
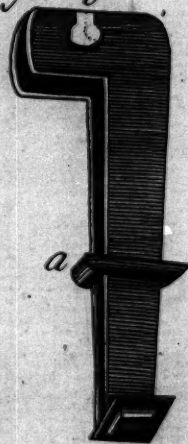


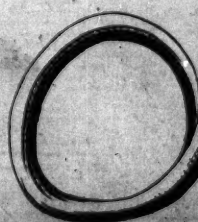
fig 2



fig 5 b



a



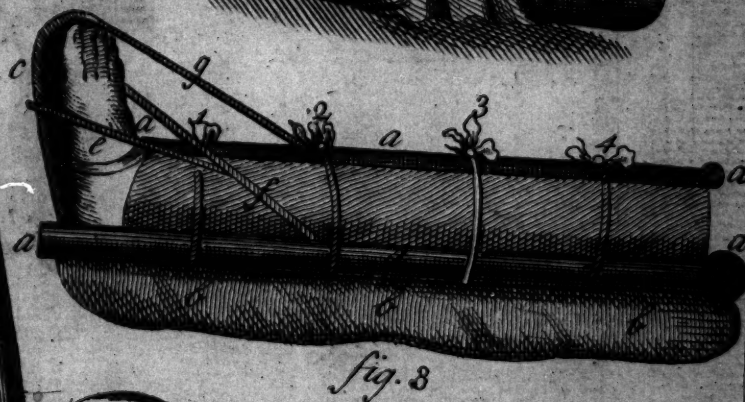
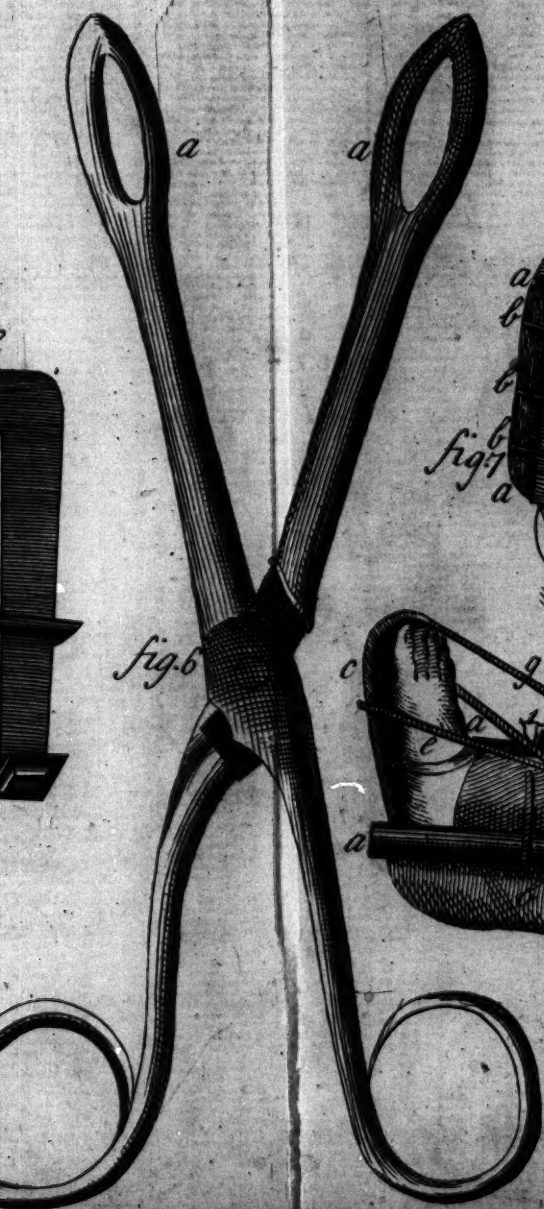
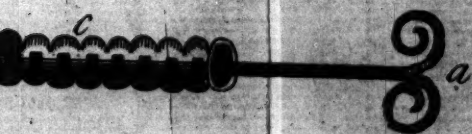
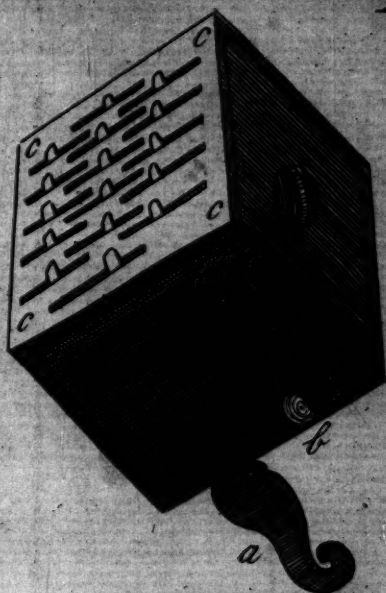
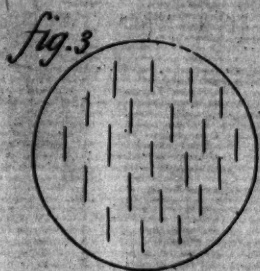
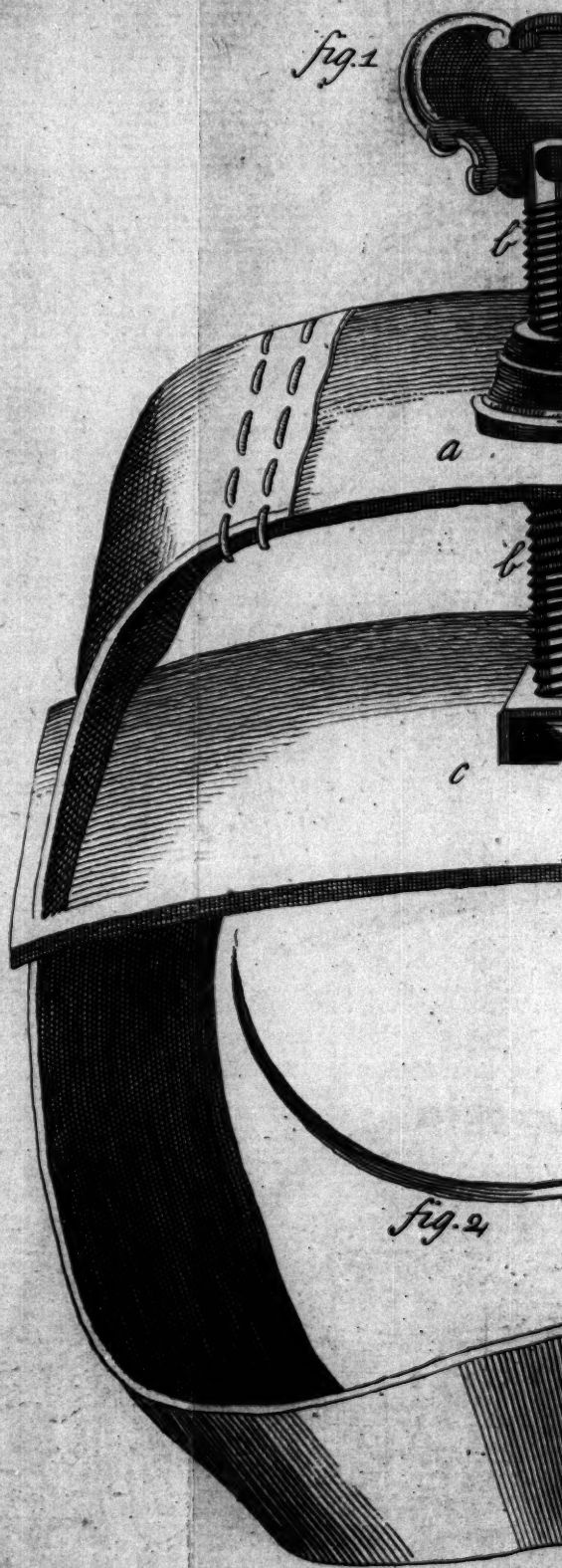
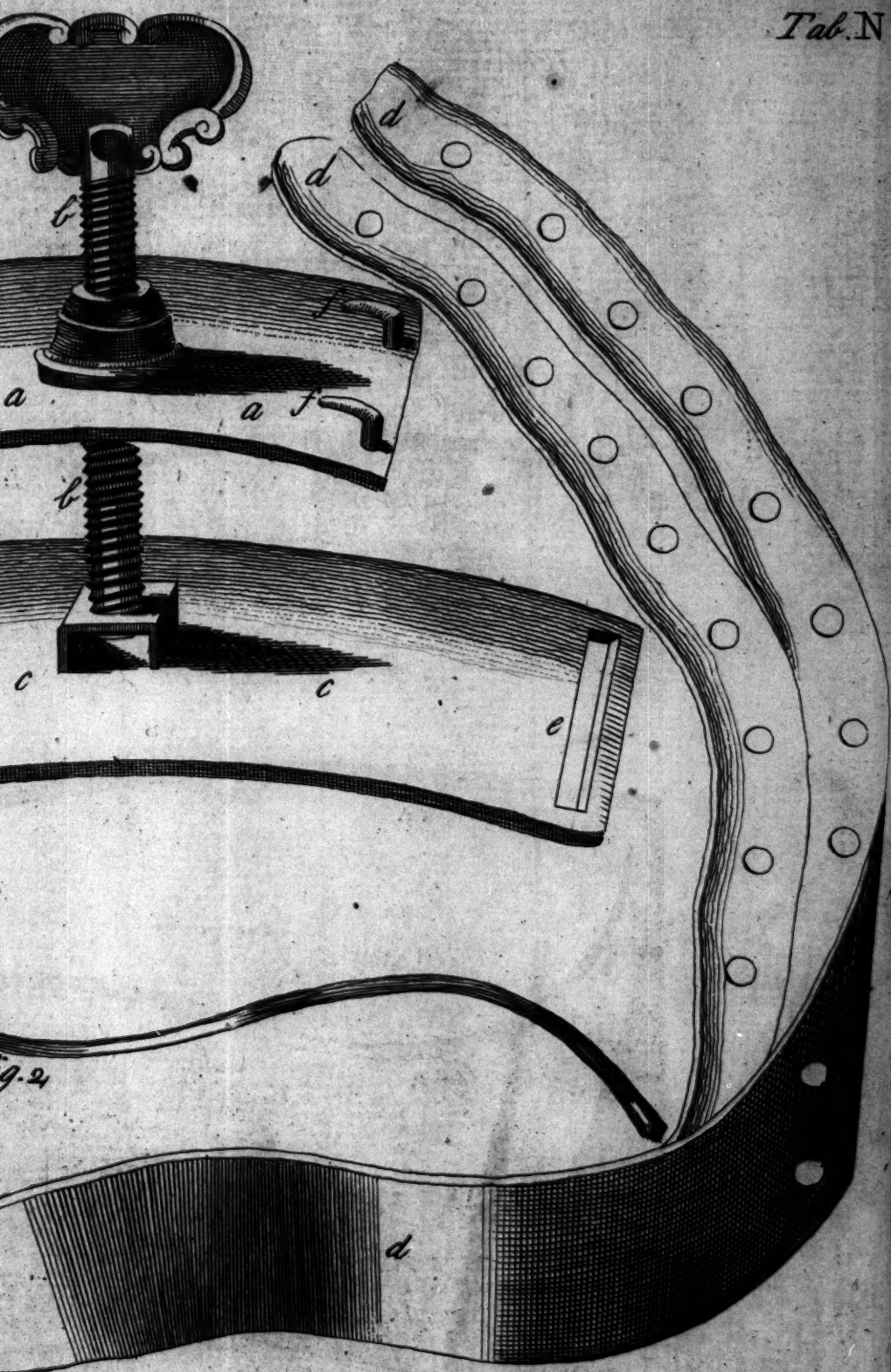


fig. 1





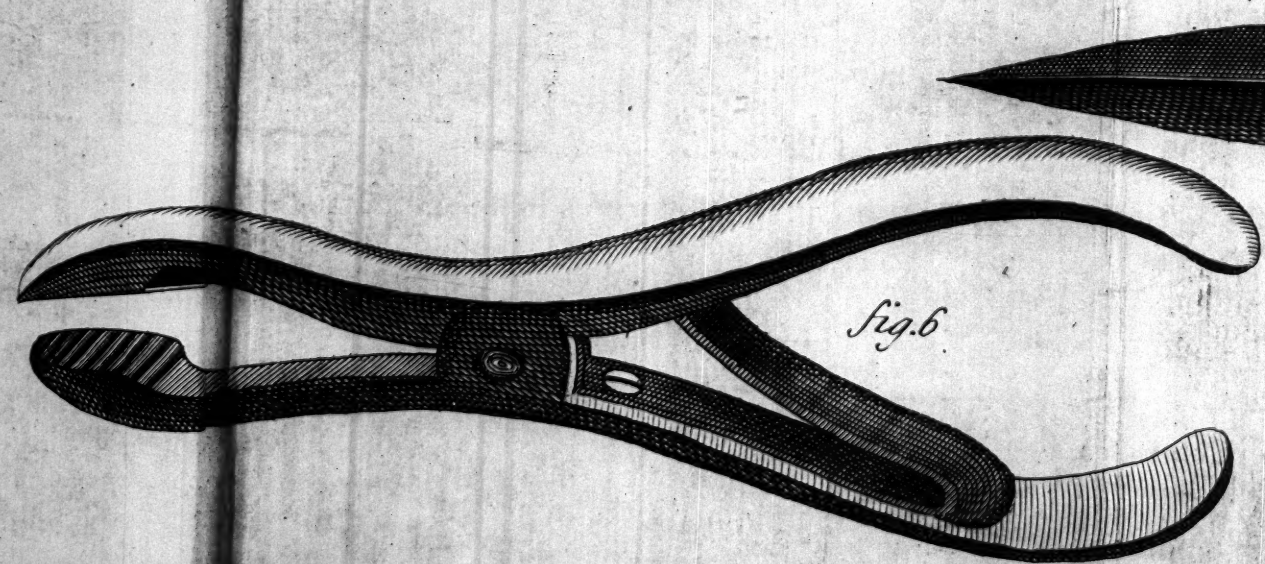
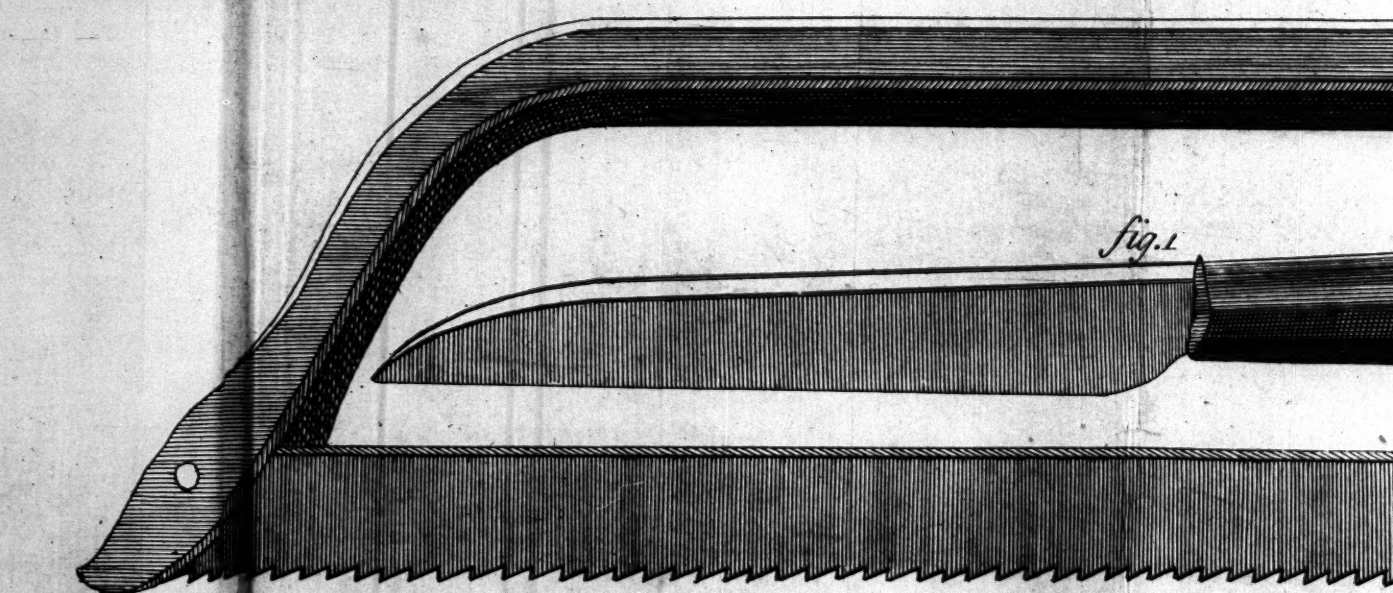
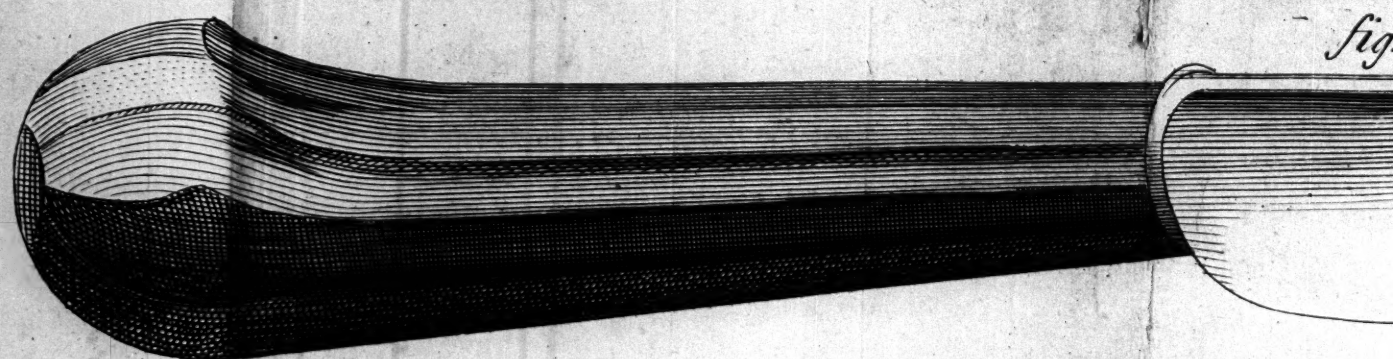


fig. 2

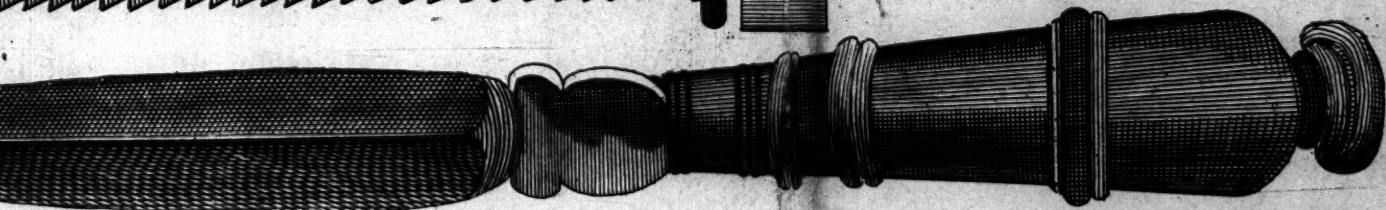
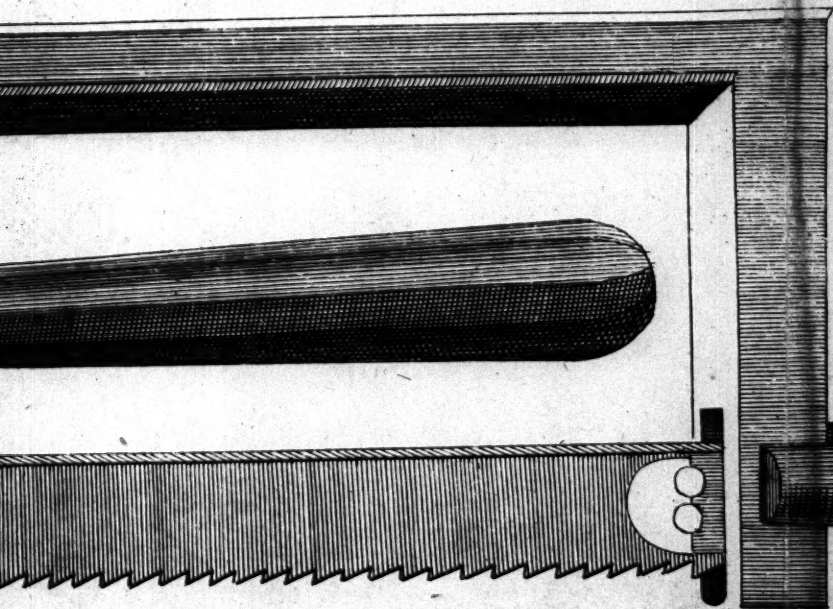
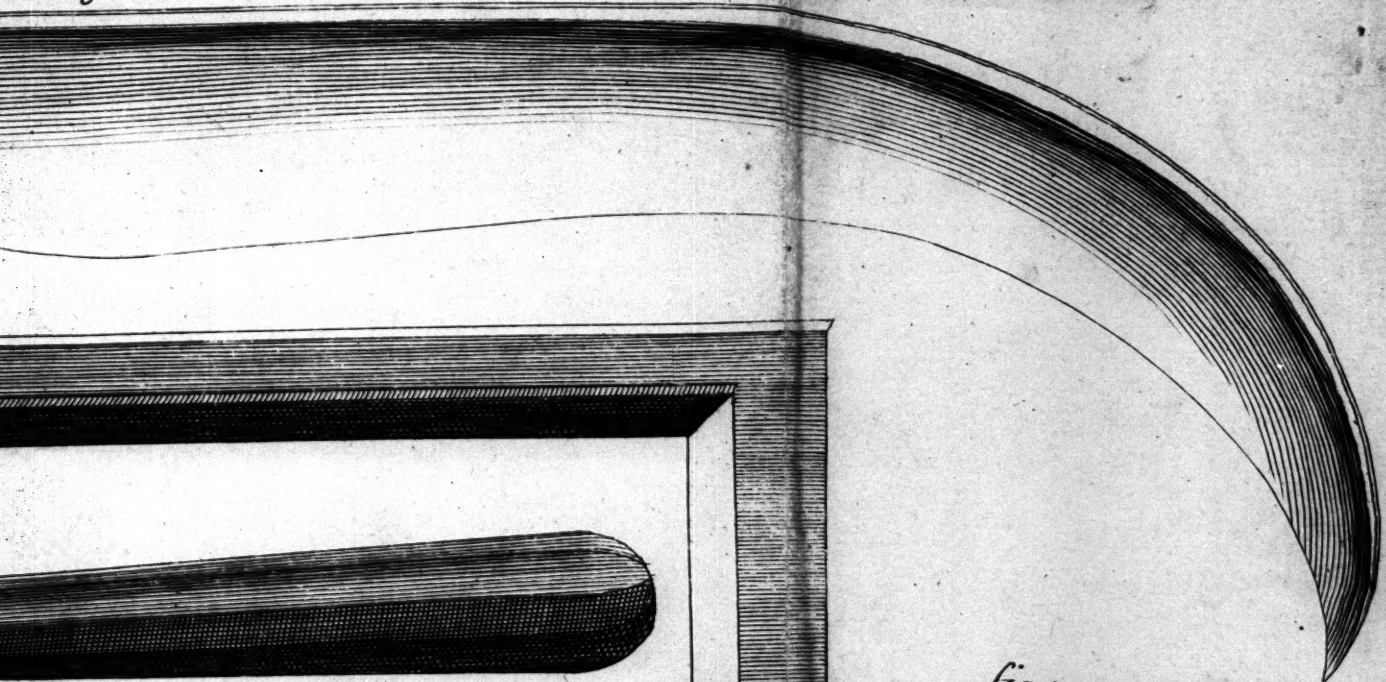


fig. 3

fig. 4

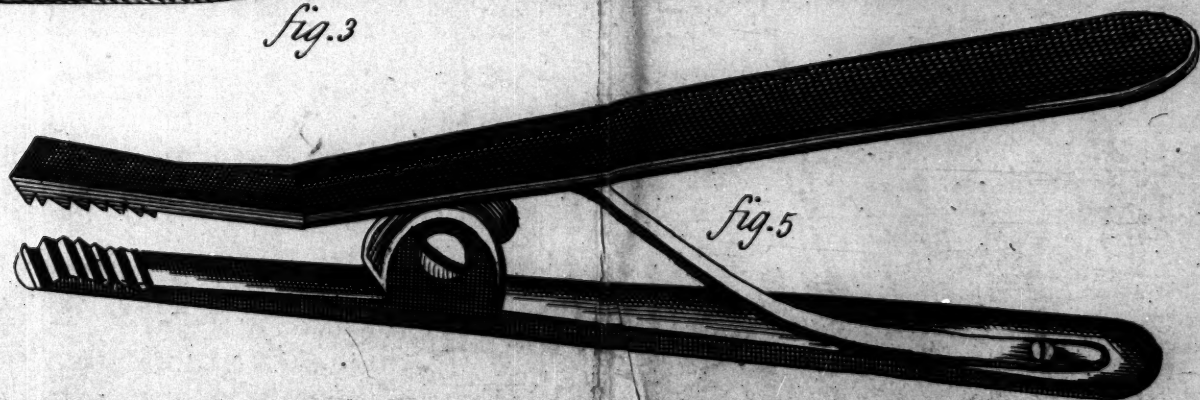


fig. 5

Tab. O

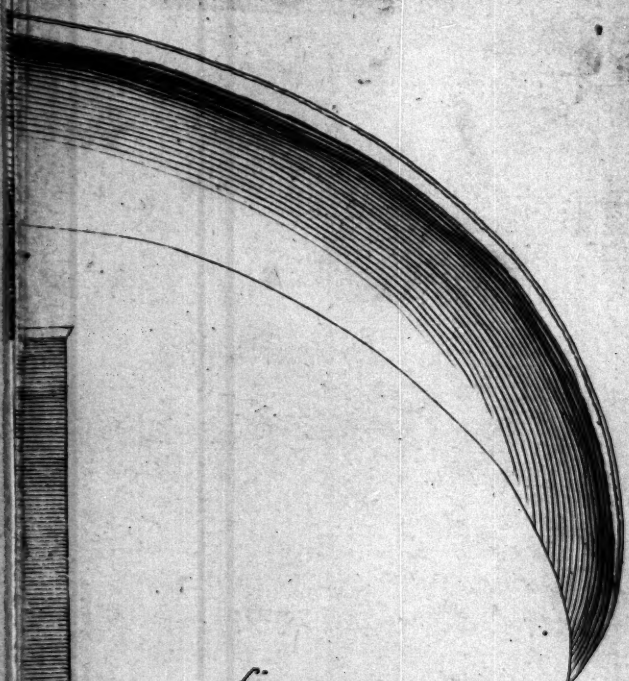


fig. 4

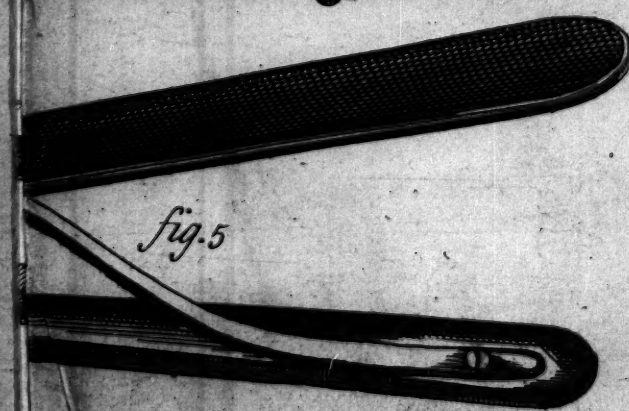


fig. 5

two junks or cylindric bundles of straw, with a stick in the middle of each; *bbb* the subjacent pillow; *c* the foot-board; 1, 2, 3, 4. tapes by which the whole is tied fast to the leg by as many knots on the outer side; *efg* the ligatures fastening the foot-board to the straw junks on each side.

T A B L E N.

Fig. 1. Represents a brass tourniquet after the manner of M. *Petite*. *aa* a brass plate a little incurvated, *bb* a strong brass screw, *cc* the moveable plate likewise a little incurvated, which immediately compresses the artery; *dd* a strong leather belt fastened to the upper plate *aa*, and passing through the opening *e* of the lower plate *cc*, and fixed by the holes to the two hooks in the upper plate marked *ff*. This instrument is one of the first used in the operation of amputating the upper and lower extremities.

T A B L E O.

Represents the instruments for amputations of the upper and lower extremities.

Fig. 1. Denotes a small sized scalpel, more commodious for dividing the skin and flesh in amputations than the large crooked one following.

Fig. 2. A large crooked or falciform knife, commonly used for dividing the flesh to the bone in amputations of the upper and lower extremities, though in many cases the small one preceding is preferable.

Fig. 3.

Fig. 3. Represents a catlin or double-edged scalpel for dividing the flesh and ligaments betwixt the bones of the cubitus and leg. This knife is also used in the method of amputating the tibia, which preserves the calf.

Fig. 4. Represents the saw used for amputating bones of the limbs. This instrument is often made as large again as the figure; but we find that one of the same size, or but little larger than the figure, will perform the operation as well, or even more commodiously than a larger.

Fig. 5 and 6. Represent pliers furnished with small teeth at one end, and a spring within the handle, serving to take hold of the ends of the divided arteries, in order to secure them by ligature to suppress the hæmorrhage, after amputations of the upper and lower extremities.

T A B L E P.

Represents the instruments for extirpating cancerous breasts.

Fig. 1. Shews the old method of extirpating a cancer by raising it with large needles *bb*, armed with threads *cc*.

Fig. 2. Shews the manner of fastening the preceding threads in the hand *aa*, to elevate and amputate the cancer with a long knife *b*.

Fig. 3. Is a fork proposed by *Solingen* and *Bidlow*, to elevate the breast, and amputating cancers.

Fig. 4.

Tab. I

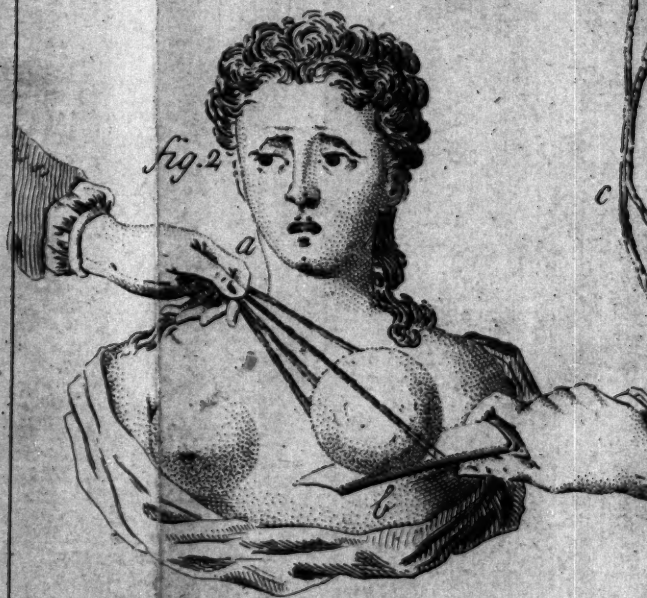


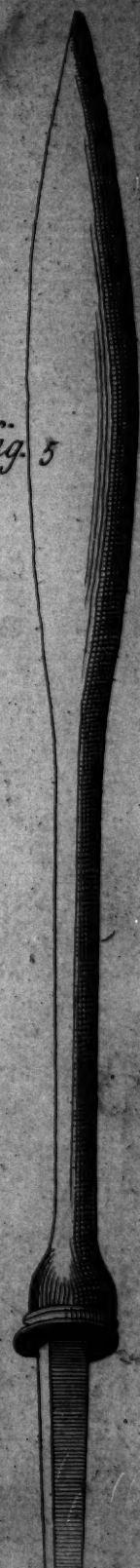
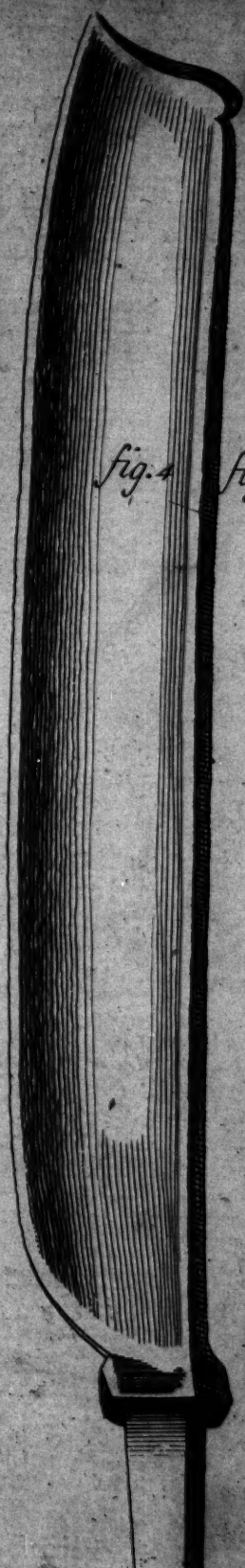
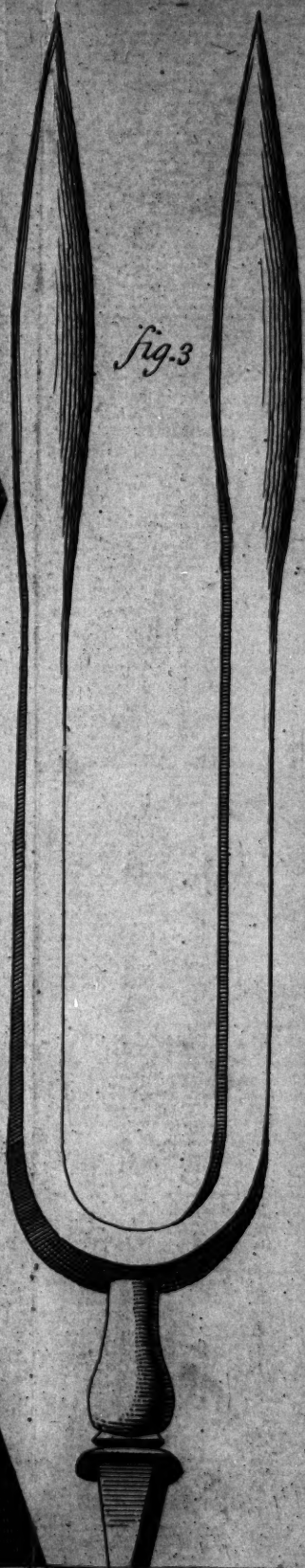
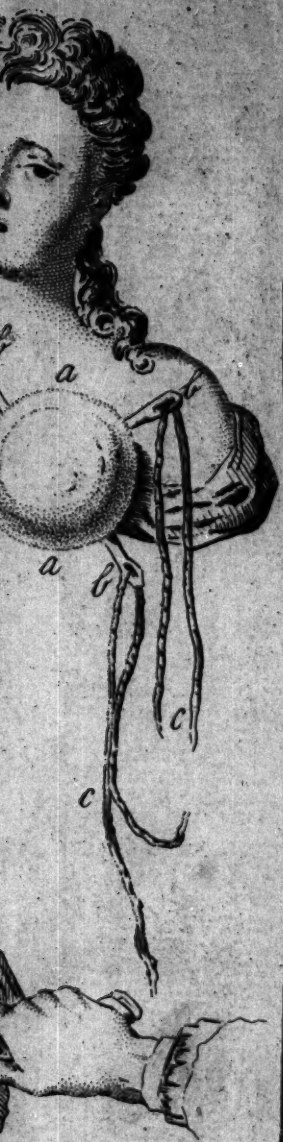
Tab. P

fig. 1



fig. 2





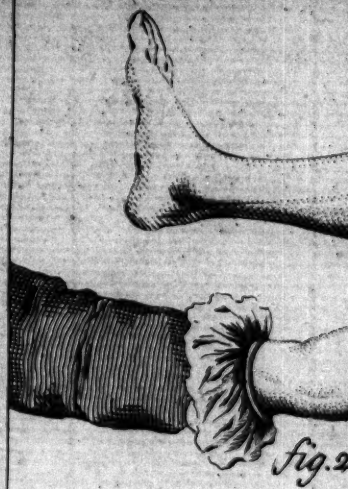
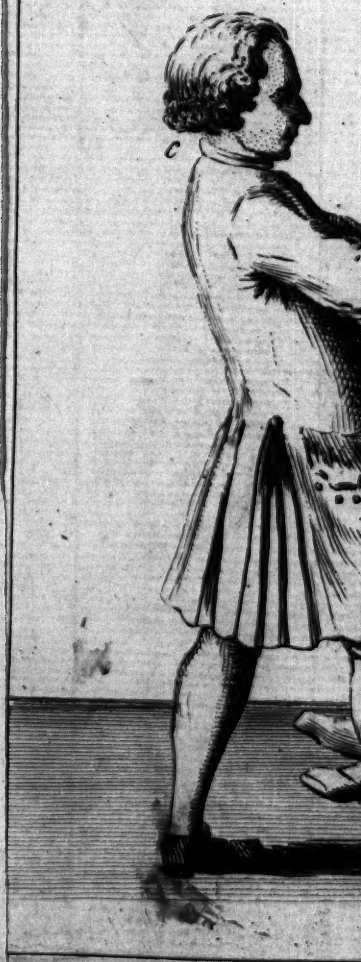


fig. 2



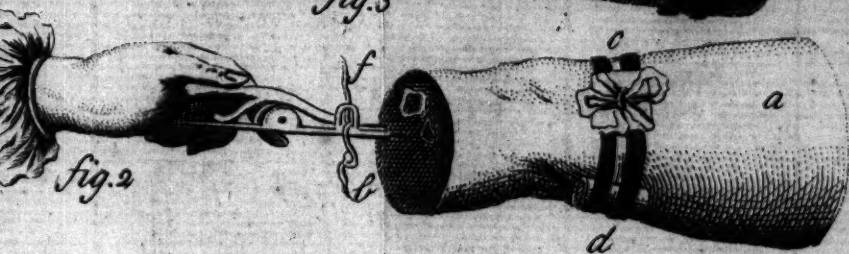
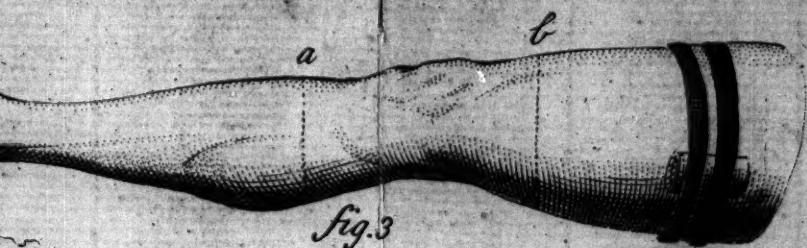




Fig. 4. A large amputating knife for this operation.

Fig. 5. Is a single fork of *Bidlow*, like a sword, for elevating cancerous breasts.

T A B L E Q.

Fig. 1. Represents the manner of amputating the hand or arm, with the manner of placing the assistants and surgeon. *a* denotes the patient, *b* the surgeon amputating with a saw, *c* the assistant extending the hand, *d* another assistant holding the arm, *e* the assistant who holds the patient's body, and takes care of the tourniquet; *f* the dish or vessel placed underneath to receive the blood.

Fig. 2. Represents the thigh marked *a*, with the leg amputated *b*, in which may be seen the tourniquet *c d*, in order to amputate the foot in the tarsus or metatarsus, and also for amputating the leg or thigh; though for the latter the tourniquet may be more conveniently placed higher up. In this figure you have also a view of the divided artery extended a little by the pliers *e*, in order to be tied by the ligature or knot *f*. There are some indeed, who think this method of securing the arteries by ligature not sufficiently safe, whereas it is found by experience to answer very well, provided the ligature be not too small, but of some breadth, to prevent it from cutting thro' the coats of the artery; and at the same time you by this means avoid the fatal symptoms which are often brought on when the nerves together with the circumjacent flesh are constricted along with the vessel, in the way of making ligatures by the

X

needle;

needle; and this is a circumstance which ought to be guarded against with all possible care, as convulsions and even death itself may be the consequence of such a stricture upon the nerves, when the surgeon does not in the least suspect the real cause.

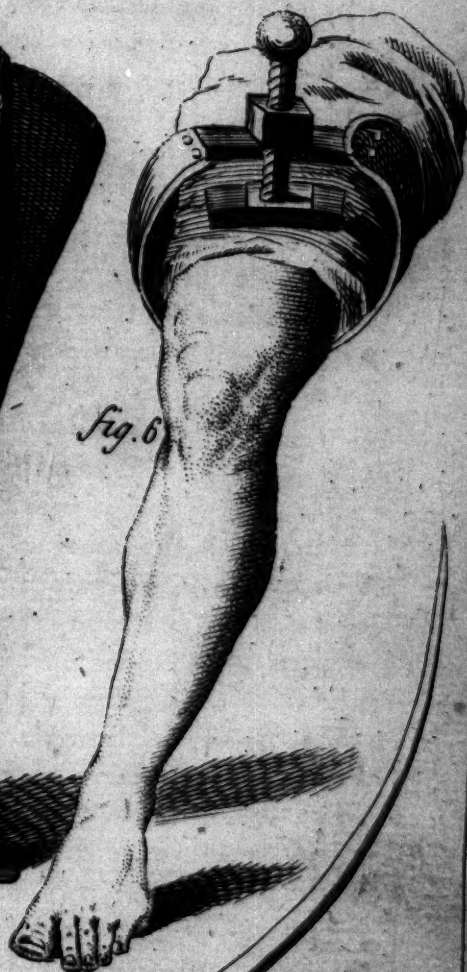
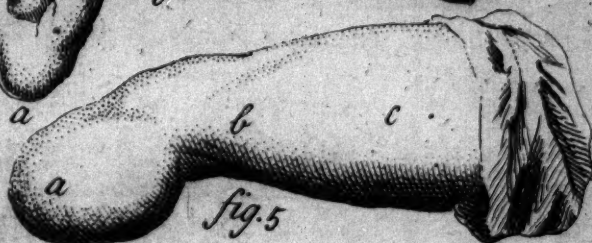
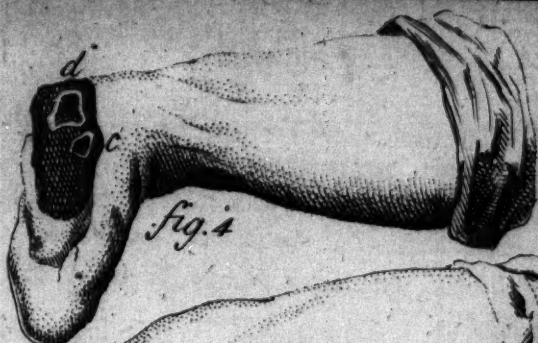
Fig. 3. Represents the most convenient part for amputating the leg at the mark *a*, and the thigh at the mark *b*. But when the disorder has extended itself higher up in the thigh, the amputation must be made proportionably above this mark, though the operation then becomes the more dangerous.

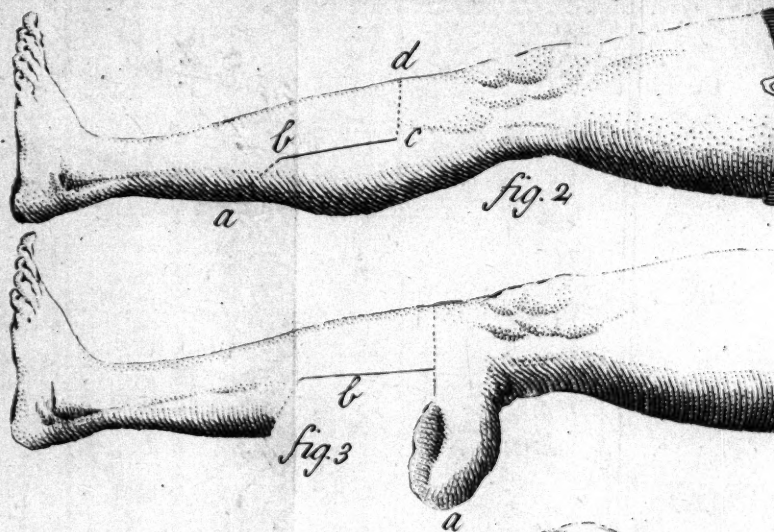
TABLE R.

Fig. 1. Represents the position of the surgeon, patient and assistants, for amputating the leg. *a* the patient seated in a chair, *b* the surgeon, *c* the assistant holding the foot below the calf, *d* the assistant holding the leg above the knee, *e* the vessel placed on the floor to catch what little blood may be spilt in the operation.

Fig. 2. Represents the manner of amputating the leg, so as to preserve the calf to fold over the extremities of the bones, *ab* denotes the first incision to be made by the two-edged scalpel represented in *Tab. O. Fig. 3.* *bc* the course of the second incision, by which the flesh of the calf is separated from the bones of the leg. *cd* the place where the bones of the leg are amputated. Some indeed reverse this course of the incision, and first perforate the calf with the two-edged scalpel, according to the line *c*, and then they direct the knife in the course *ba*.

Fig. 3.





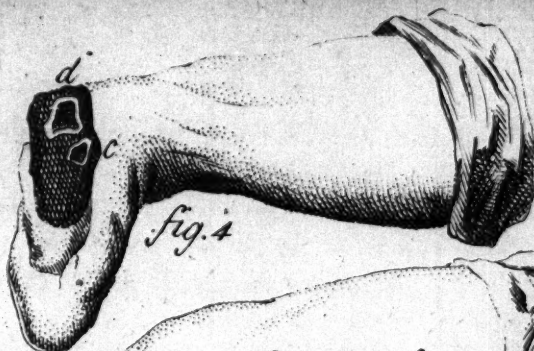
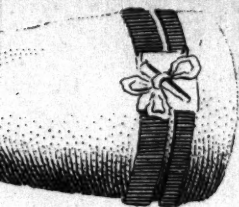


fig. 4

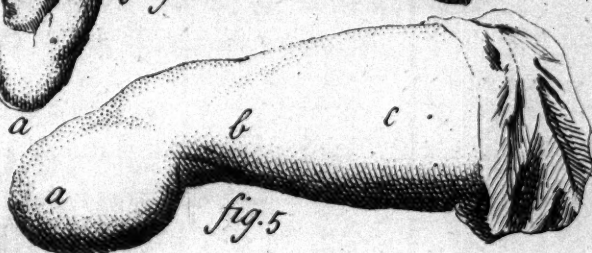
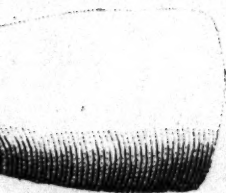


fig. 5



fig. 1

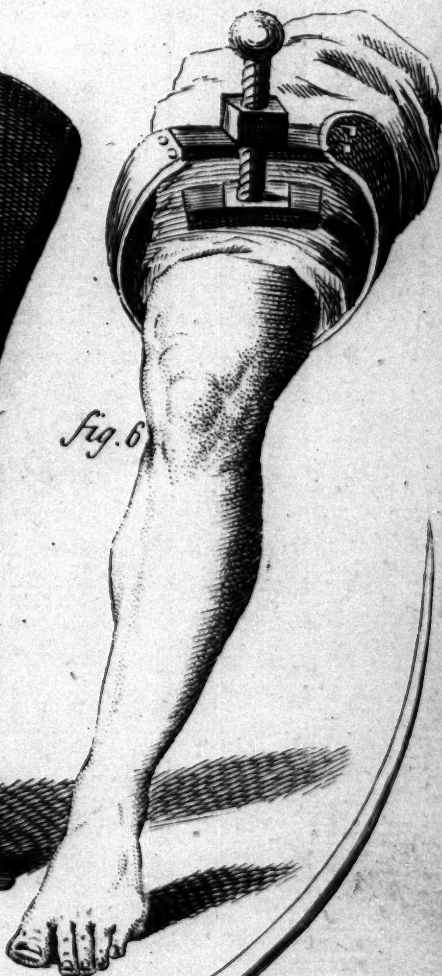


fig. 6

Fig. 3. Shews the manner of reflecting back the calf of the leg towards the ham, after it has been separated from the bones by incisions; which done, the surgeon next divides the integuments, flesh and periosteum in the line *b*, and then saws through the bones in the same place.

Fig. 4. Represents a leg just amputated in this manner, with the calf *a* depending, so that one may see the ends of the bones; *b* the tibia, *c* the fibula.

Fig. 5. Represents a leg thus amputated with the calf *a* brought over and joined to the stump *b*; *c* denotes part of the thigh.

Fig. 6. Represents the manner of fixing the screw-tourniquet, *Tab. N.* upon the thigh before amputations, &c.

TABLE S.

Fig. 1. A represents the grand kerchief or capital bandage used after trepanning, and in wounds of the head, but represented more particularly by *Fig. 2.* — BC represent the napkin and scapulary. D the manner of applying the ligature after bleeding in the arm. E denotes the bandage called a stirrup to be applied after bleeding in the foot. FG represent the oblique spiral course in which bandages ought to be applied upon the leg or arm, that they may fit firm upon the limb without subsiding. H a transverse wound of the thigh, the lips of which require to be retained by the true future. I the part of the arm where the tourniquet is applied: the compress I being fixed

within-side the arm, the ligature is drawn tight by twisting the turn-stick K, which is secured from pinching the flesh by a piece of pasteboard. LM shew the common tourniquet applied to the thigh in the manner which is necessary when the leg is to be taken off above the knee. N represents the tourniquet fixed upon the lower part of the thigh; as when the leg is to be taken off below the knee.

Fig. 2. Represents the grand kerchief applied after trepanning, and in wounds of the head. It is made with a napkin folded one third over the other, after which it is applied with the middle upon the head, so that the edge may extend almost to the eyes, and the corners hanging over the cheeks, the two uppermost of the narrow part are tied under the chin *aaa*; but the anterior corners of the lower and largest fold of the napkin are carried back and round the occiput *b*, and fastened on each side near the ears. *cc* represent the posterior angles brought from the occiput to the forehead, and there fastened by the knot *d*; *ee* the middle of the bandage investing the head.

The next bandage serving for the hydrocephalus, and for the same purposes with the preceding, is termed capeline, represented and described before in *Tab. E. Fig. 14.*

Fig. 3. Represents the knotted bandage to be applied after opening an artery in the temples, or after the extirpation of a scirrhus parotid gland, or a wound, &c. It consists of a double-headed roller five or six ells long, and of two fingers breadth, applied with the middle to the sound temple opposite the wound; then carrying the
two

TAB. S.



Fig. 11.

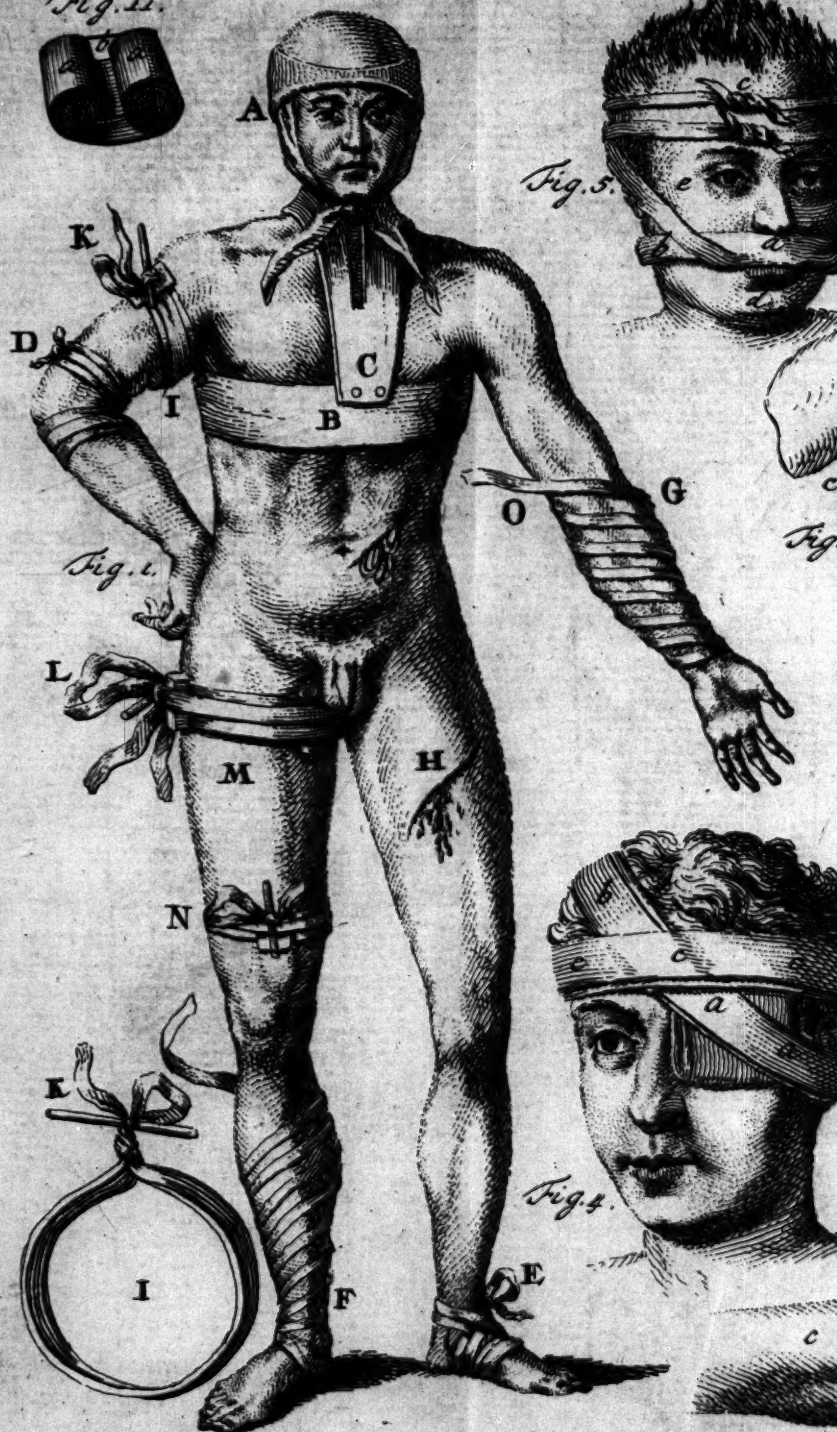
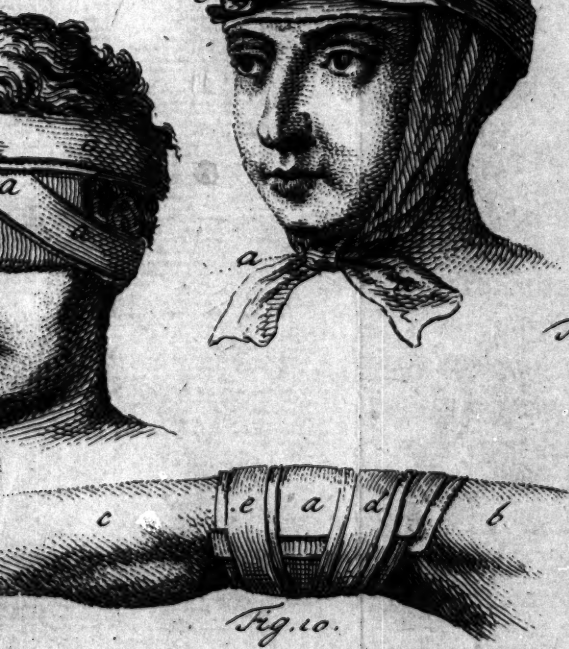
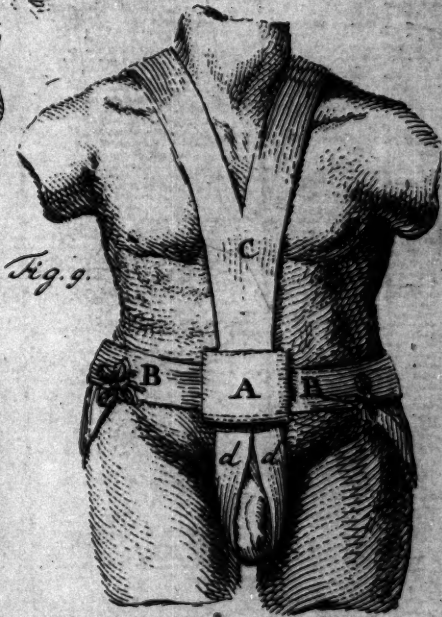


Fig. 5.

Fig. 1.

Fig. 4.





two roller heads *a* and *b* to the other temple, they are crossed so as to form the knot *c* upon the dressings, from whence one roller is carried under the chin *d*, and the other over the vertex of the head *e* to the sound temple, where they are crossed, and the like course repeated as before. — But after the extirpation of a scirrhus parotid, &c. the bandage is applied with its middle on the sound side; and after the first circumvolution about the head as before, the perpendicular course of it *de* is oftener repeated, and instead of making the knots or crossings upon the temples, they are here fixed upon the parotid or wounded part under the ear *f*, securing the extremities of the bandage by future.

Fig. 4. Represents the bandage for disorders of the eyes, which is termed either monocus or binocus, according as it invests either one or both eyes. The first is made with a single-headed roller about three ells long, and of two fingers breadth, applied with the end upon the occiput; from whence it is carried obliquely round over the dressings *aa*, and over the forehead *b* to its origin at the occiput. This course being thrice repeated, the rest of the bandage terminates circularly about the head *ccc*. The binocus is made by repeating the same oblique course of the bandage upon the other eye *aab*, before it terminates circularly about the head *ccc*.

Fig. 5. Represents the bandage for the hare-lip; *a* its middle, which is not slit; *bb* its two upper heads, which are tied upon the forehead at *c*; *dd* its lower heads, which being carried obliquely over the cheeks *ee*, are crossed upon the occiput,

occiput, and then fastened by a knot on the forehead under the former.

Fig. 6. Represents the manner of applying the bandage after bleeding, a fracture, or luxation in the foot: A the circular rounds about the ankle: B the spiral and circular turns about the tarsus and metatarsus.

Fig. 7. Represents the bridle for a fracture or dislocation of the lower jaw, the middle part having an opening is applied to the chin *a*, after which the two upper heads are carried round *b*, and crossed on the occiput; from whence being brought over the forehead *cc*, they are tied in a knot; but the two lower ends of the bandage *e* are carried up by the sides of the cheeks *f*, and fastened with a knot *g* upon the crown of the head, or else carried down again, and tied under the chin.

Fig. 8. Represents the reflexed bandage for a fracture of the clavicle, consisting of a double-headed roller of six ells in length, and three fingers breadth, applied with the middle over the dressings to the top of the affected shoulder *a*, so as to pass obliquely over the præcordia *b*, while the posterior roller-head crossing the back obliquely, comes round under the sound axilla over the breast *d*, and passing over the anterior roller-head continues its course under the axilla of the affected side *e* to the back, where it crosses again the other roller-head, which is reflected back as before at *f* upon the clavicle; and thus the same course is repeated again till the part is invested *g b*.

Fig. 9.

Fig. 9. Represents the napkin and scapulary bandage, as it is adapted to disorders of the abdomen and perinæum. *A* a compress fixed to the napkin and scapulary for an omphalocele. *BB* the napkin. *C* the scapulary. *dd* two slips of the bandage passing betwixt the thighs, are carried round the nates, and fastened to the napkin or belt at *BB*. This scapulary *C* with its appendages *dd* will likewise suffice without the napkin *BB*, for retaining the dressings after cutting for the stone, or for a fistula in the anus, a bubo, &c.

Fig. 10. Represents the delegation for a transverse fracture of the patella. *a* the patella, *b* the thigh, *c* the leg, *de* the turns above and below the patella, crossing in the ham like the figure 8.

Fig. 11. Represents a double-headed roller sewed together at each end, so as to leave a space in the middle *b* for sustaining the heel and tendo *Achillis* in fractures, and for retaining the patella in a perpendicular fracture of it.

T A B L E T.

Fig. 1. Represents the bandage for retaining the dressings after an amputation of a cancerous breast. *A B C D* denote the first course of the roller, which is repeated several times, and terminated circularly upon the dressings *E F*.

Fig. 2. Represents the simple spica bandage for injuries in or near the shoulder and axilla. The middle of the bandage is fixed under the sound axilla *a*, and ascending cross the back and breast

breast *b* to *c*, the roller-heads there cross and pass under the axilla *d* of the affected shoulder, upon which it rises again and is crossed at *e*, thence descending to the axilla *a*, and the same course repeated as before.

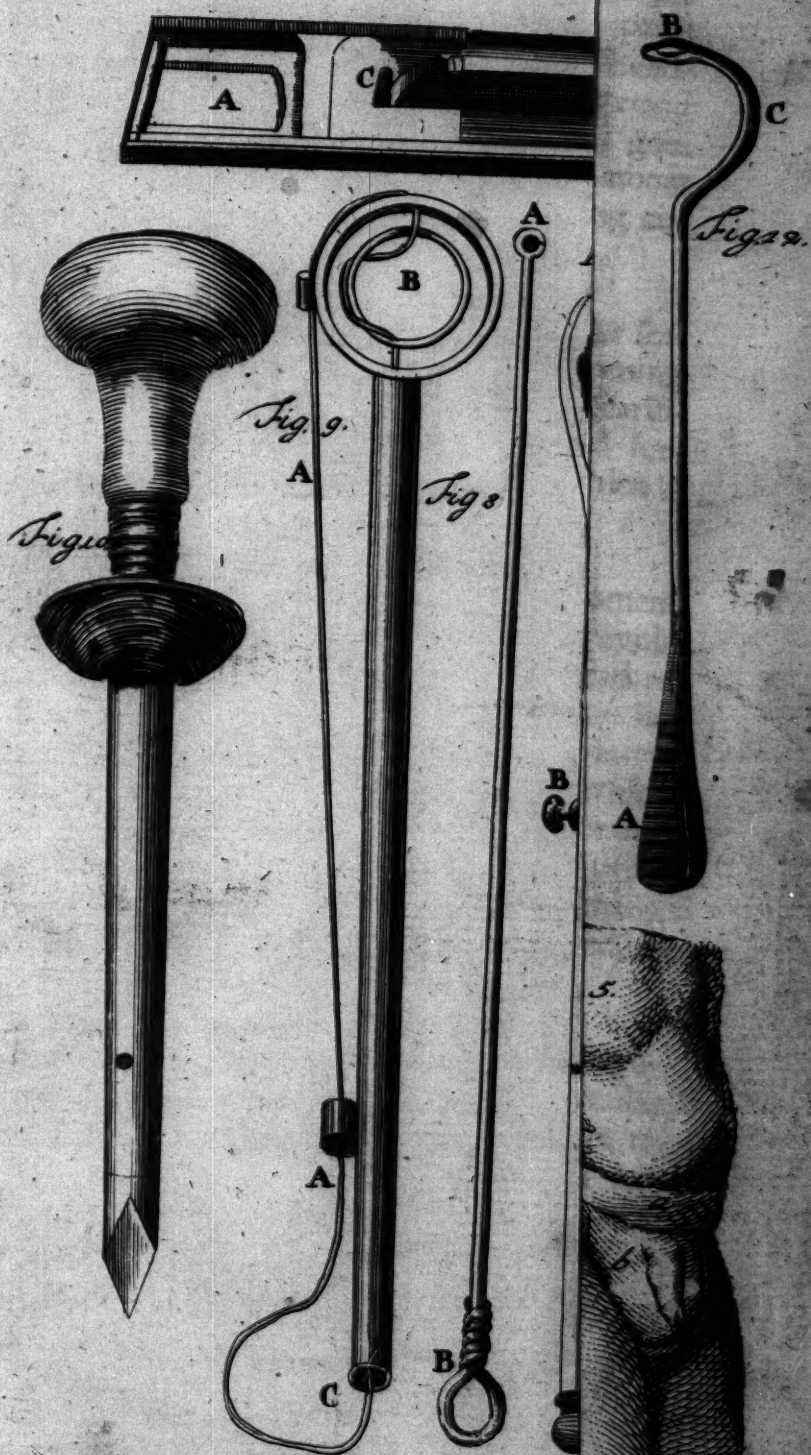
Fig. 3. Represents the spica inguinalis simplex, beginning with a double-headed roller at *a*, carried in the course *bb* to *c*, and thence by *ed*, and up again to *c*; and thence again to its origin at *a*, serving for intestinal ruptures, a luxation of the femur, a fracture of its neck, or of the os ileum.

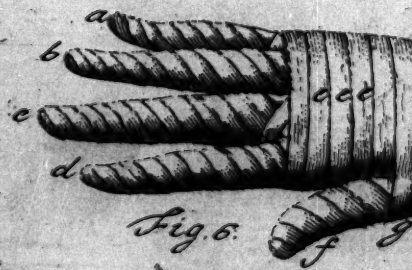
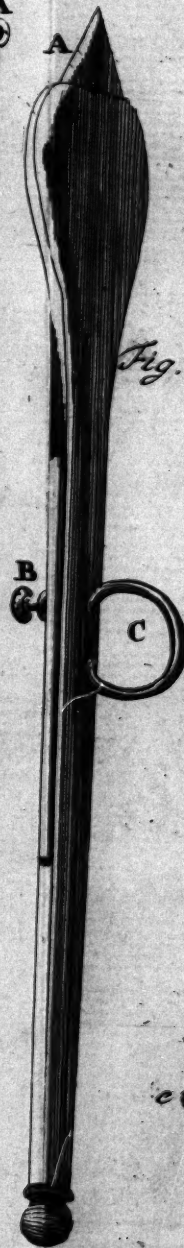
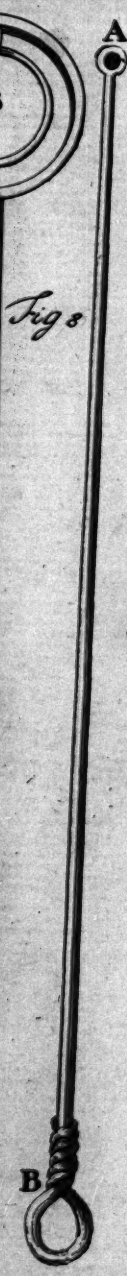
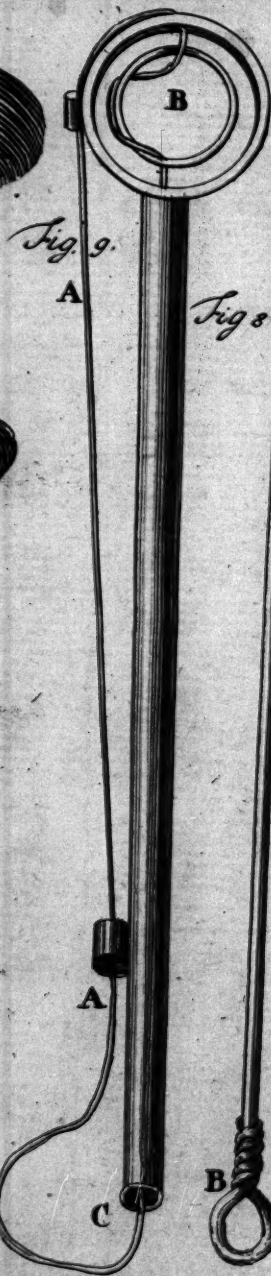
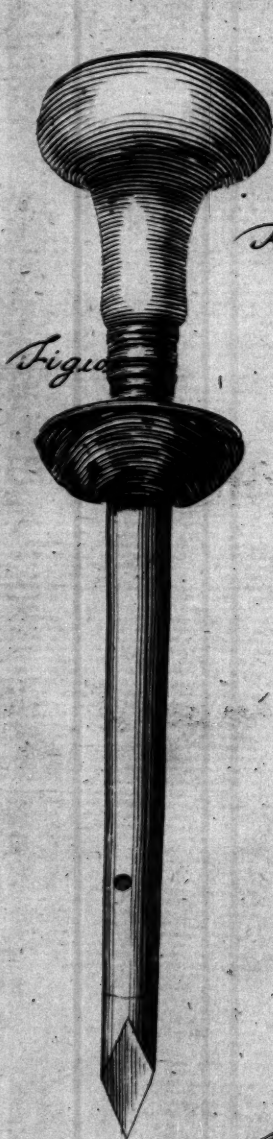
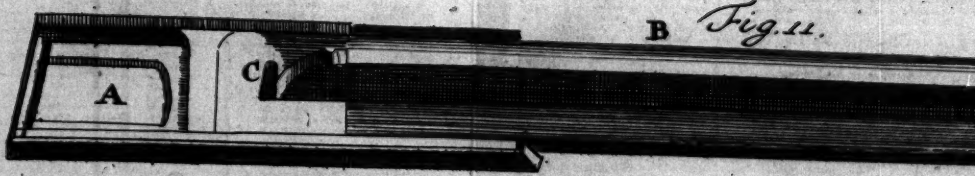
Fig. 4. Represents the double-knotted bandage, serving chiefly to restrain the hæmorrhage after cutting for the stone, and the fistulæ of the anus. The middle of the roller is applied first over the perinæum, thence according to *bc*, where being crossed, the roller heads are carried over the abdomen and back *d* to *e*, crossed and carried along *f* to *g*, where the roller heads change hands, and form a knot like that for arteriotomy, *Tab. S. Fig. 3.* and the same course repeated as at first. But to make the bandage stricter, the rollers may be carried obliquely upwards over the shoulders in the course represented by the two pricked lines.

Fig. 5. Represents the bandage for investing the scrotum, called a bag-truss; *aa* the transverse part that goes round the body, *bb* the perpendicular part with the aperture *c* to transmit the penis.

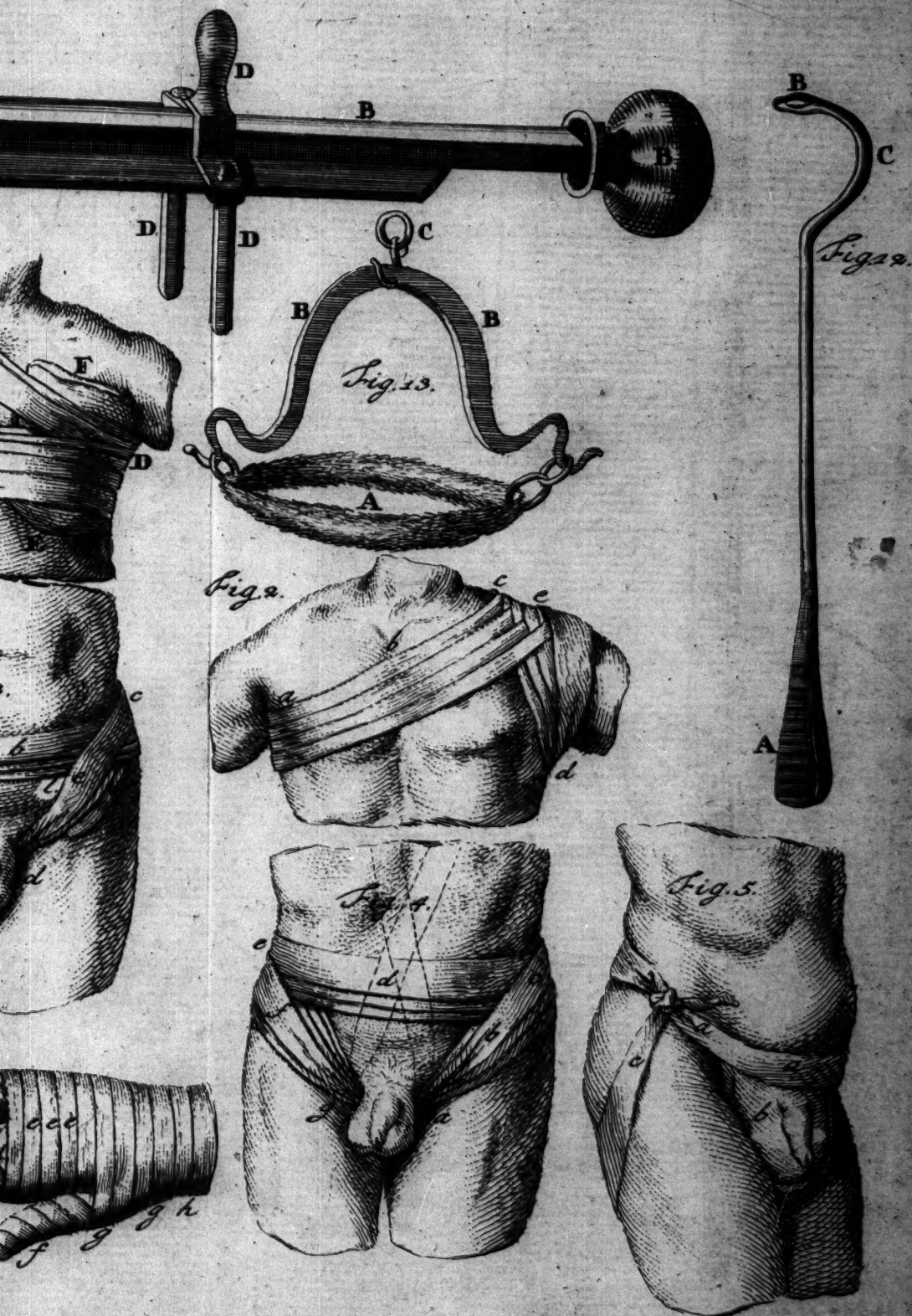
Fig. 6. Represents the glove-bandage for a burnt or scalded hand, made with a piece of tape

AB:T.





TAB. T.



TAB. I.



six ells long and an inch broad, begun upon the carpus *b*; whence it is carried across the palm to *a*, which is the first invested by a spiral ascending and then descending turns, thence to *bc* and *d* in the same manner; from which last it goes circularly about the metacarpus *eee*, then about the thumb *gf*, and from thence terminating circularly about the carpus *g h*.

Fig. 7. Represents the paristhmiotomus for scarifying the tonsils when inflamed, or opening them when suppurated. *A* the concealed scarificator, *B* the handle by which it is moved forward, *C* the handle of the instrument by which it is held.

Fig. 8 and 9. Represent a brass instrument contrived by *Hildanus* to extirpate a diseased uvula by ligature. *AA*, *Fig. 9.* denote the thread or ligature properly disposed and fastened in the instrument, *B* the loop of the ligature which intercepts the uvula, *C* the part of the ligature which is to be drawn by the hand. *Fig. 8.* denotes a wire of steel or brass for transmitting the ligature through the cannula of the preceding instrument. *A* the aperture which transmits the ligature, *B* the handle.

Fig. 10. Represents a trochar or steel triangular-pointed bodkin included in a silver cannula, for making the paracentesis of the abdomen to discharge the water in a dropsy: they ought exactly to fit each other, and the edge of the cannula should be rounding towards the bodkin or perforator, to make it enter the more easily.

Fig. 11. Represents an instrument for amputating the uvula: A the part which is to receive the uvula, BB the handle by which the blade C is thrust forward to A to cut off the uvula, DDD denote the handle of the whole instrument by which it is to be held.

Fig. 12. Represents an instrument contrived to pass a string round the root of a polypus to remove it by ligature: A the handle, B C the eye and curvature.

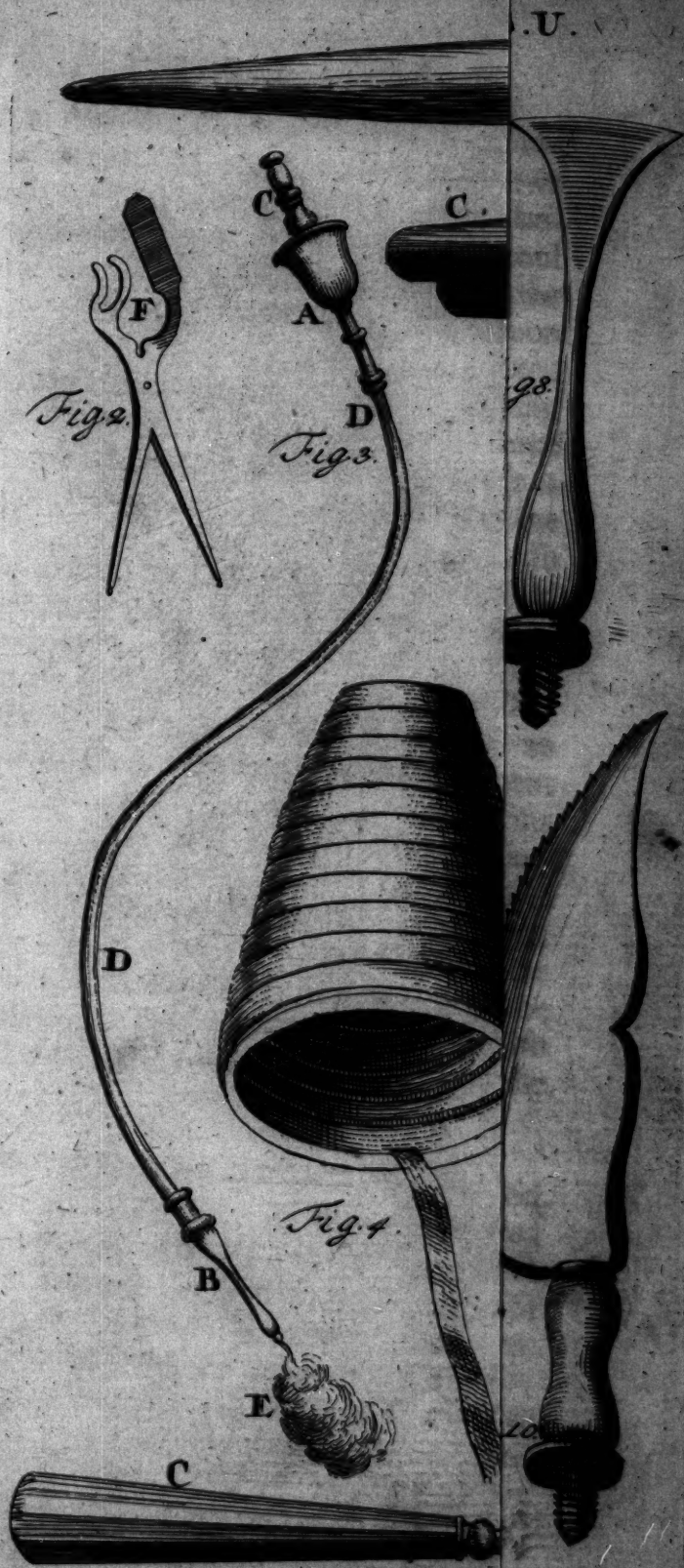
Fig. 13. Represents an instrument to swing children by the head to straighten the wry neck, or a crookedness of the spine: A the collar lined with fur; BB an iron arch admitting the head, and suspended by the ring C, by which the patient is lifted up from off the ground.

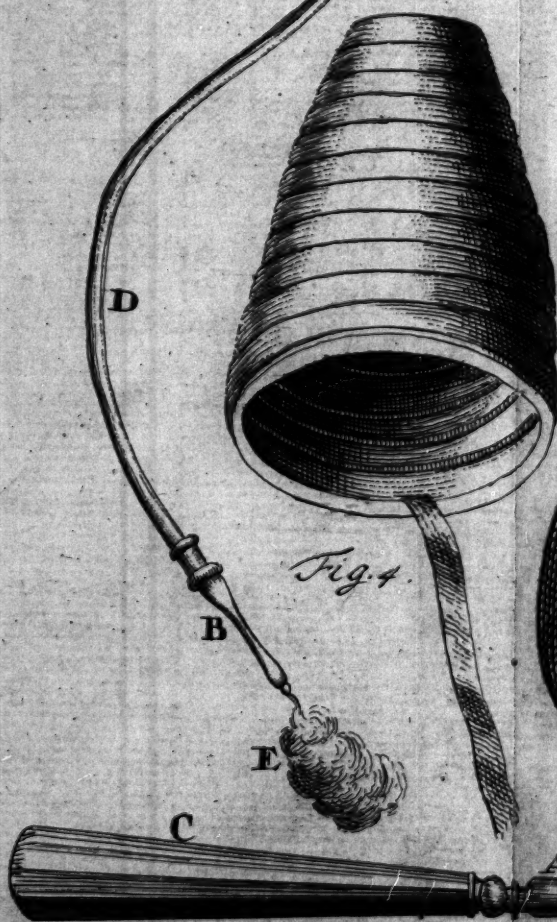
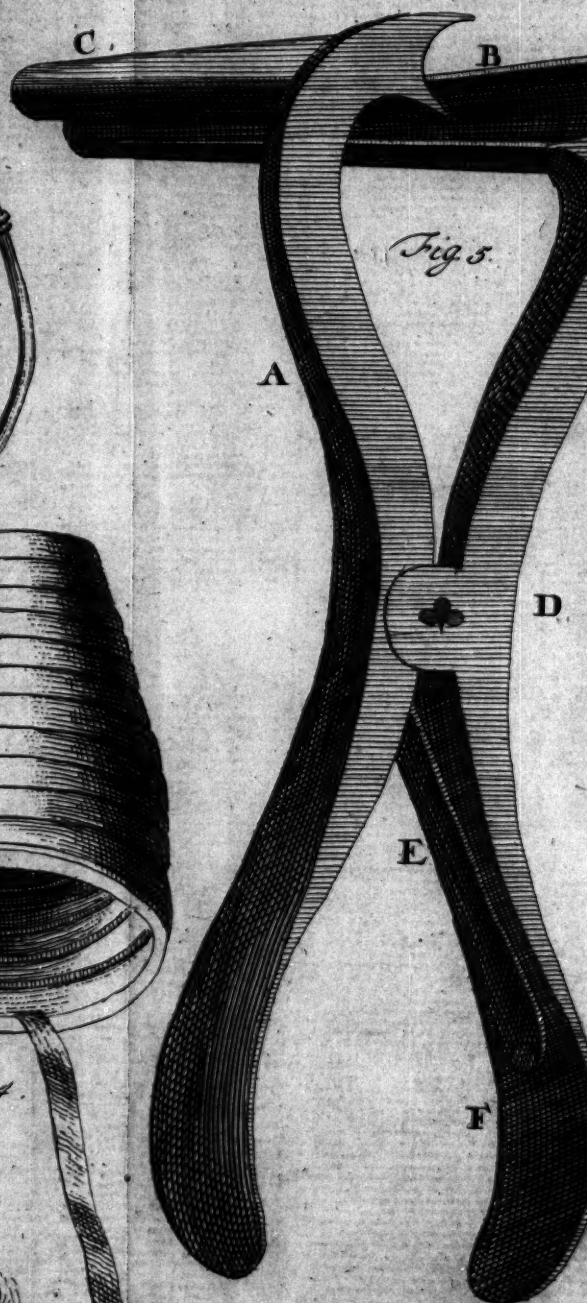
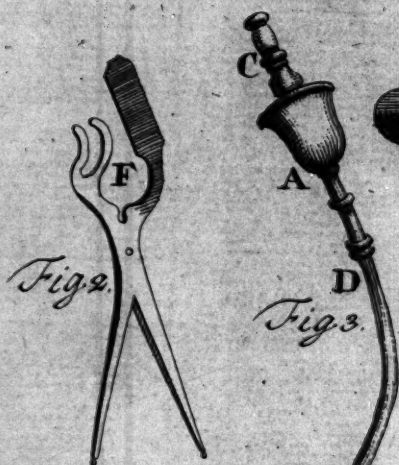
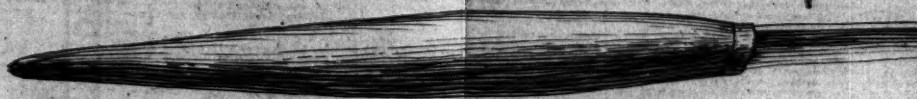
T A B L E U.

Fig. 1. Represents a needle fixed in a handle and armed with a ligature, which is to be passed through the tonsil in order to its extirpation, when the basis is larger than the extremity: but when the apex of the tonsil is larger than the basis, it may be extirpated by the ligature applied by the instrument *Fig. 9. Tab. T.* supposing the ring which supports the loop B to be bent perpendicular to the horizon, instead of being parallel with the handle of the instrument A A.

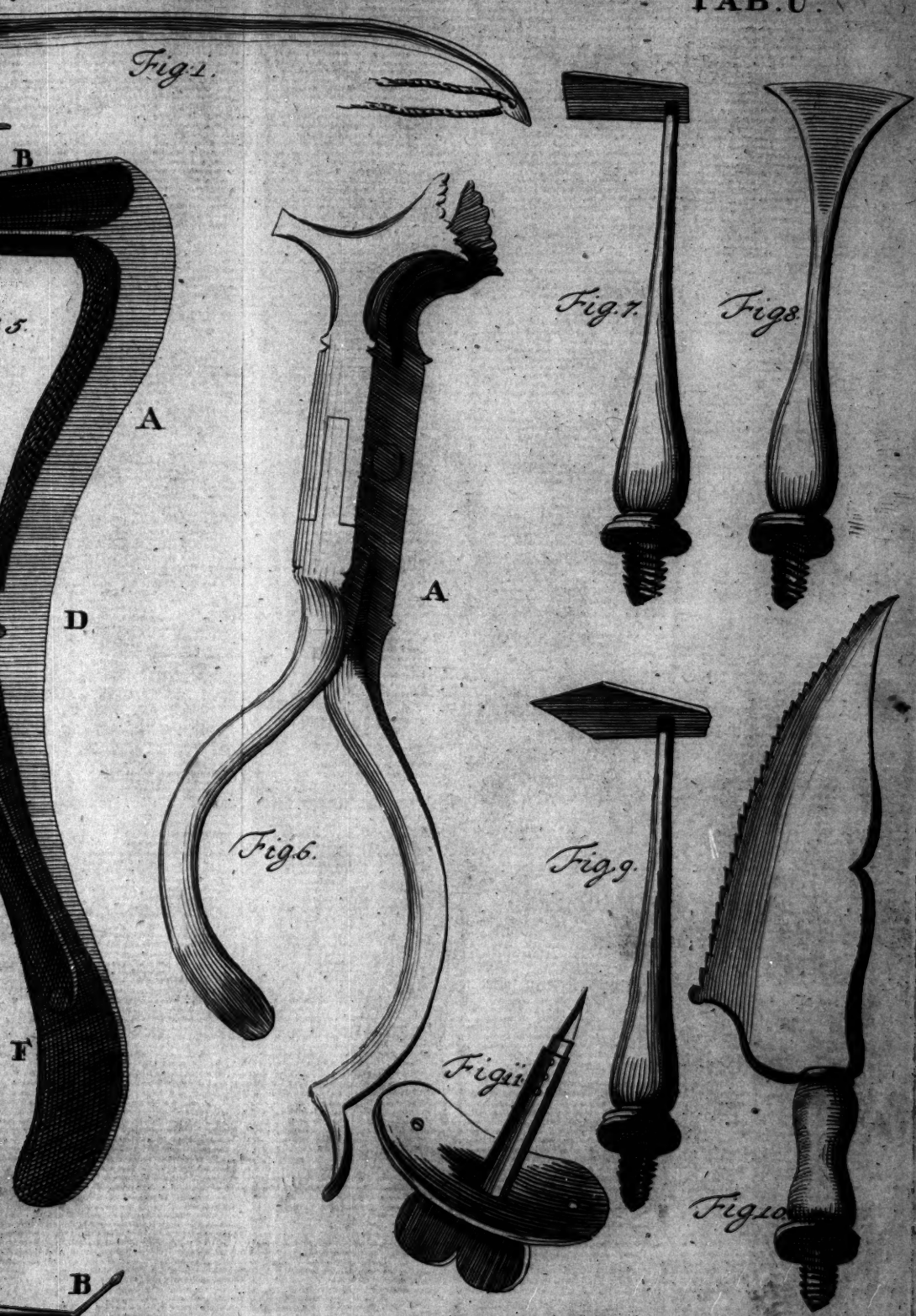
Fig. 2. Represents the model of a speculum oris to depress the tongue, in order to view the tonsils, uvula, &c.

Fig. 3.





TAB. U.



1 MAY



Fig. 3. Denotes a fumigating machine. *A* represents an iron box, the lid of which unscrews for the reception of an iron heater, which being heated red in the fire, and suffered to cool till it appears dark, is then placed in the box, the lid *C* screwed on, and cinnabar poured in upon the heater; after which the ivory pipe *b* is fixed in and applied to the mouth, which by blowing forces the fumes through the iron box and pipe *A*, and through the leathern pipe *DD*, till it is discharged at *E* by the ivory tube *B*. Thus the fumes are concentrated into a small compass, so as to act more effectually upon a chancre, an old sore or venereal ulcer, &c. in which the efficacy of cinnabarine fumigations is very great, in order to dispose the parts for healing. The pipe *DD* may be commodiously made of the ureter of an ox or sheep inflated or dried. This instrument will likewise serve for making other fumigations with sulphur, gums, salts, &c. and it will likewise serve to administer a clyster of the smoke of tobacco, supposing the heater to be taken out, and the tobacco fired in the iron box *A*, the smoke being blowed by the mouth through the pipe *DD* and *B* into the anus. It may be also used for blowing moist or dry fumes into the ear, &c.

Fig. 4. Represents an elastic pessory or steel wire turned into a conical worm, and covered over with bees-wax, having a string fastened to the basis for its extraction. It is very useful for sustaining a bearing down of the uterus or vagina.

Fig. 5. Denotes a speculum ani, consisting of a hollow cone *BC*, which being gently warmed and

and lubricated with oil, is then introduced into the anus or vagina, and the sides of the cone gradually open for inspection, by pressing on the handles *EE* turning upon the hinge *D*; and furnished with the spring *E*.

Fig. 6. Represents a pair of forceps contrived to take out the circular piece of bone, which has been cut from the rest of the skull by the crown of the trepan, or of the trefine. The extremities of the forceps *aa* are to be made conformable to an arch of the same circle with that of the saw or crown of the trepan. *b* denotes a small elevator affixed to one handle of the instrument.

Fig. 7, 8, 9. Represent different kinds of scraping chisels for the cranium, to be screwed into a convenient handle.

Fig. 10. Represents a small fine saw of a convex figure, for dividing fragments or asperities of the skull.

Fig. 11. Represents a small kind of trochar for performing the operation of bronchotomy. In the wings of the cannula are two holds, by which it is to be tied round the neck; and within should be contained another cannula, which may be taken out and cleaned upon occasion from the mucus or moisture which is apt to obstruct it. The length of the cannula should be about an inch, more or less, in proportion as the incumbent parts upon the windpipe are more or less distended and swelled, and its shape may be made rather oval or elliptical than perfectly round.

Fig. 12. Represents a small kind of trochar for performing the operation of bronchotomy. In the wings of the cannula are two holds, by which it is to be tied round the neck; and within should be contained another cannula, which may be taken out and cleaned upon occasion from the mucus or moisture which is apt to obstruct it. The length of the cannula should be about an inch, more or less, in proportion as the incumbent parts upon the windpipe are more or less distended and swelled, and its shape may be made rather oval or elliptical than perfectly round.

Fig. 12. A steel instrument to cauterize a hollow aching tooth, and fill it up with leaf gold or lead, to exclude the air and aliments which cause their bony part to rot and decay.

T A B L E X.

Fig. 1. Represents a common couching needle for depressing a cataract or opake crystalline lens to the bottom of the vitreous humour, as represented in *Tab. 2. Fig. 5.* The broad part of the needle at the point is flat on one side, but a little convex on the other to give it a greater strength, as in a lancet tending to a sharp edge. The handle is ivory tinged with a stripe of black upon that side which is even with the convex surface of the blade, that by holding the black part of the handle upwards when the point of the needle is in the eye, one may be guided to depress the cataract by the flat surface of the needle when it cannot be seen through the pupil.

Fig. 2. Represents a figure of the human eye; *a* the oblique position of the optic nerve; *b* the posterior cavity of the eye which is filled with the vitreous humour; *c* the true figure of the crystalline lens included in its membranous capsule, from whence go off obliquely the ciliary processes or ligaments on each side; *d* the iris perforated by the pupil *f*, and suspended in the midst of the aqueous humour, which distends the cornea *e*. The space occupied by the aqueous humour is distinguished into two chambers, which bear a great disproportion the one to the other: the anterior chamber, before the iris and next the cornea, being much larger than the posterior chamber

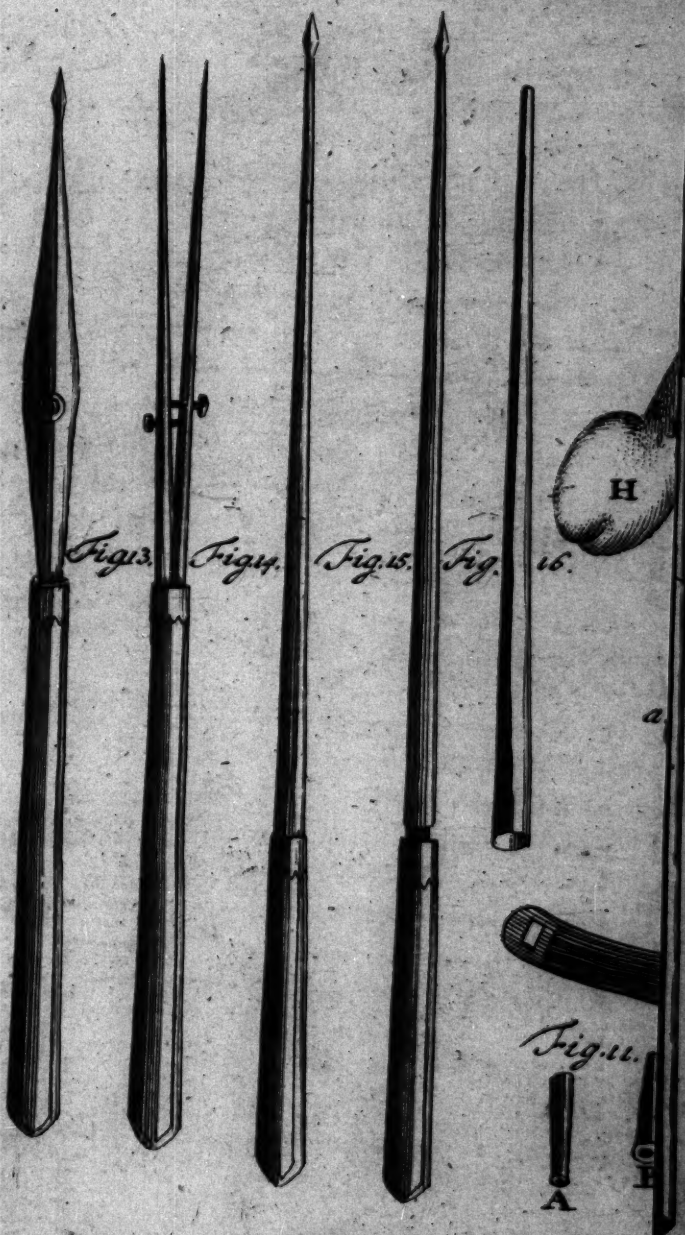
chamber next the crystalline lens and behind the uvea.

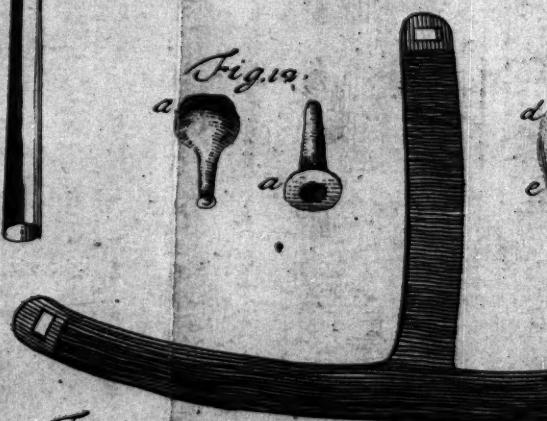
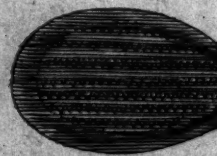
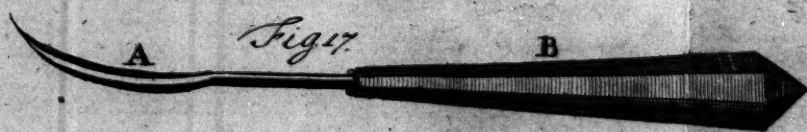
Fig. 3. Represents the canalis nasalis, which conveys the tears from the eyes into the nose; *bb* the lachrymal points opening in the upper and lower eye-lid; *cc* the lachrymal ducts which lead from the puncture to the sack *ad*, which opens into the nasalis canalis *dde*.

Fig. 4. Denotes a small silver syringe *A*, to which is adapted the pipe *B*, with a capillary tube *b*, to be introduced into the puncta lachrymalia, for injecting warm water, or some other deterging liquor, in order to cleanse and heal those passages into the nose, when they are obstructed or ulcerated in the fistula lachrymalis. *C* denotes a small capillary probe of gold or silver wire to be introduced by the puncta lachrymalia, *Fig. 3.* *bb* through the lachrymal ducts *cc* into the nose by the canal *de*, for clearing the passages when the resistance is greater than will give way to the force of an injected fluid.

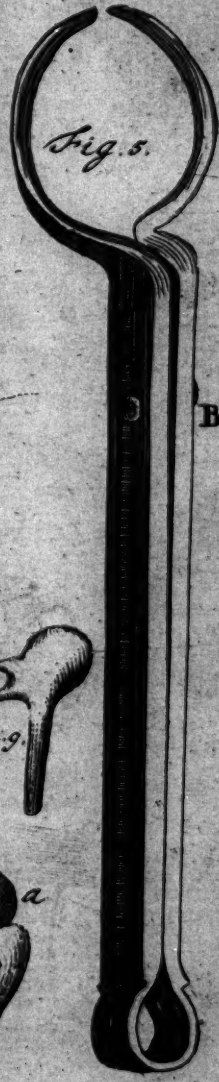
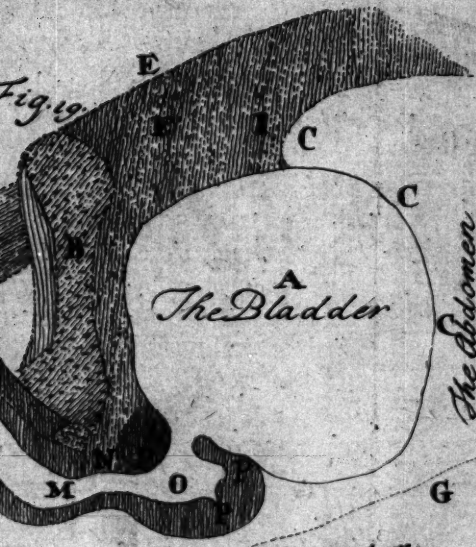
Fig. 5. Represents a spring speculum oculi made of silver or steel, capable of opening more or less by the button *B*, which slides along a slit in the handle, to support the eye-lids in couching, scarifying, or performing any other operation upon the eye. The instrument is made so as to fly open by its own elasticity, if the branches of the handle were not confined by the button *B*.

Fig. 6. Represents the situation of the lachrymal points *aa*, ducts *cc*, and sack *d*, with the nasal canal *ef*, as they are disposed with respect to the





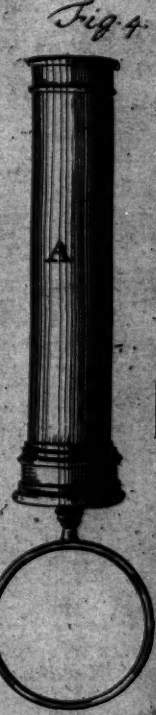
TAB. X.



The Rectum

The Bladder

The Abdomen



the eye represented before by *Fig. 3*. A lachrymal fistula then is an obstruction and inflammation with or without an ulceration in some of these passages, whereby the tears are obliged to run down the cheek, instead of being absorbed and conveyed into the nose by the opening of the canal *f*; and therefore the seat of this disorder may be either in the ducts *c*, *e*, in the sack *d*, or in the canal *e*.

Fig. 7. Represents a lachrymal fistula in the upper duct *a*; and in the lower duct *b*.

Fig. 8 and 9. Represent the same disorder in the saccus lachrymalis.

Fig. 10. Represents an instrument for making a compressure upon the saccus lachrymalis, made of thin pliable steel covered with velvet, to be adapted and fastened upon the forehead by three pieces of ribband tied about the head, so that the button or plate of the screw may fall upon the lachrymal sack. Mr. *Sharp*, from whom this instrument is taken, tells us that the branch of iron which supports the screw must be soft enough to bend, without which it will be difficult to place the button exactly on the bag. This instrument he thinks capable of curing a recent fistula barely by compressure, or at least that it ought to be tried before the operation.

Fig. 11. Represents small tubes of lead or gold *A B*, which are proposed by some to be left in the parts, to continue a passage from the eye into the nose; but it does not seem practicable to heal the membranes as long as these tubes are left in.

Fig. 12.

Fig. 12. *aa* represent silver tubes to keep open the new-made passage into the nose after the operation for the fistula lachrymalis, till the passage is become callous or cicatrized.

Fig. 13. Represents a new kind of couching needle invented by Mr. Cleland (*Phil. Trans.* N^o 461. p. 844.) You have here both a front and a lateral view (*Fig. 13.*) of this instrument, which differs from the common couching needle in this, that it is made up of two pieces of steel folded together, and fixed in a handle; at a little distance from the handle they separate, and have in each lamina a button fix'd, which passes through a hole in the other; from this part to the points they are so nicely applied and polished together, that they cut, and have the shape of a common needle. Upon pressing the buttons, the points are separated; and in the inside of the broad part of the points are several small indents, to prevent any thing from slipping after it has once got hold. The use of this needle is, either to depress a cataract; or, if it should be found of such a nature as to bear to be taken hold of, then, by opening the points, to engage it, and carefully bring it out of the eye. If it should happen that in depressing the cataract, or in bringing it out of the eye, some of the small vessels are wounded, and some drops of blood diffuse themselves in the aqueous humour; this second needle (*Fig. 14.*) is made with design to remedy this inconveniency. It is a long, small, round stilet (*Fig. 15.*) gradually decreasing from the handle to the point; and is fitted to a long silver tube of the same shape (*Fig. 16.*) into which the needle is put, and the point comes out at the end a quarter of an inch.

This

This is to be introduced into the eye at the orifice the other needle has made : when it is so far introduced, that the end of the tube is within the posterior chamber of the aqueous humour, the needle is to be withdrawn, leaving the tube in the eye ; and then with the mouth may be sucked into the tube, all the blood and watery humour that is contained there, or any other floating particles : then the tube is to be withdrawn, and the eye left to replenish itself with the aqueous humour again, which will take twelve or eighteen hours at most.

Fig. 17. Represents a needle fixed in the handle for elevating and dissecting small blood-vessels in the conjunctiva tunica and white of the eye ; as also to raise and dissect a pterygium or hard skin.

Fig. 18. Represents a scarificator, or fine steel rasp of a convex figure, designed to scarify the eye-lids and white part of the eye in an ophthalmia.

Fig. 19. Represents a section of the bladder and Urethra, as they appeared by injecting them with wax ; an idea of which is very necessary to be had, in order to pass a catheter or staff to search or cut for the stone, &c. A denotes the section of the bladder. B the section of the pubis. C the cavity of the abdomen. D the peritonæum. E the integuments of the abdomen. F the space between the pubis and the peritonæum, taken up by the cellular membrane. It is the place of the incision in the high operation of Lithotomy. G the rectum. H the glans. I the corpus cavernosum. K the urethra. L the elbow of the ligamentum
Y

gamentum suspenforium. M the bulb or gulf of the urethra. N the streights and elbow at the entry of the gulf of the prostate. O the gulf of the prostate. P, P, P sort of elbows or blind cavities found therein. Q the streights of the entry into the bladder.

T A B L E Y.

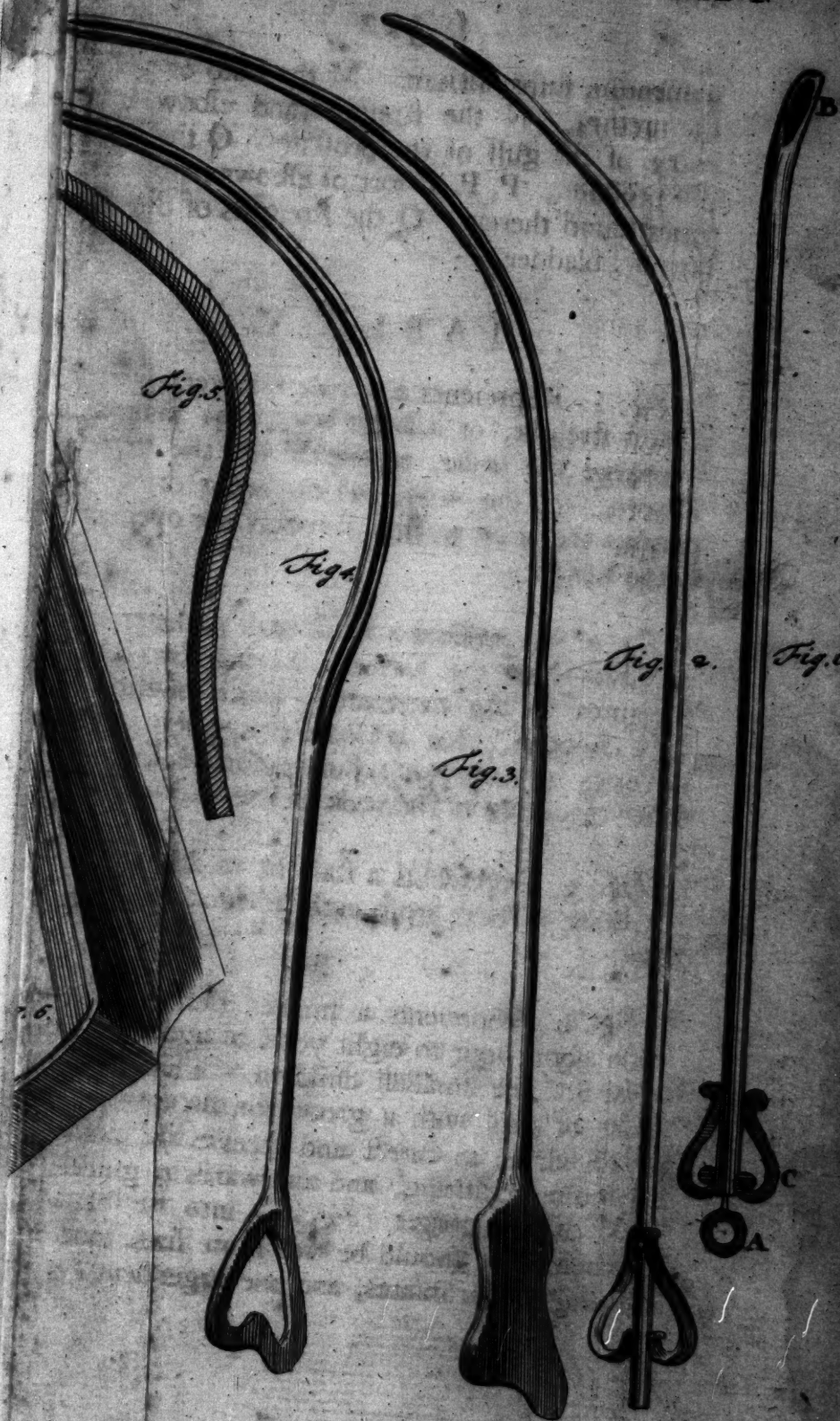
Fig. 1. Represents a female catheter, which is almost streight, of a large bore, and adapted to discharge the urine, or search for the stone in women. A the wire, which being drawn out permits the urine to flow through the opening B. C the handle.

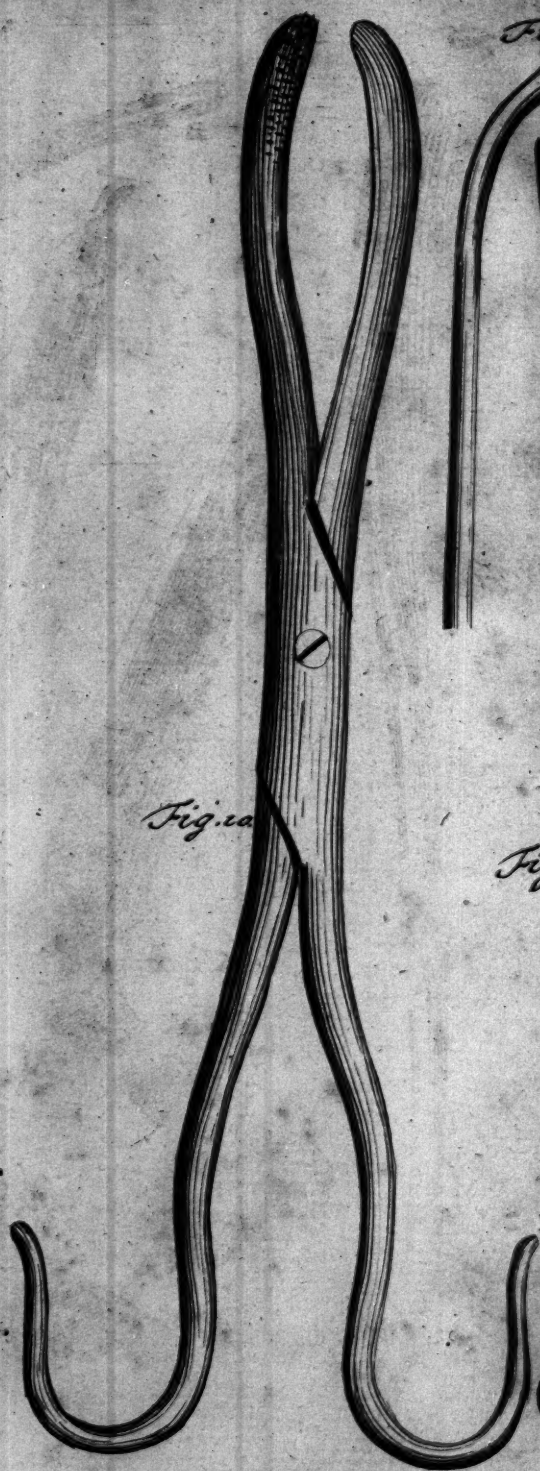
Fig. 2. Represents a small male catheter made of silver like the former, having two oblong apertures in the extremity, which ought to be very smooth, that it may pass freely without catching against the caput gallinaginis, or any other caruncles in the neck of the bladder.

Fig. 3. Represents a staff fit to cut upon for the stone in boys from eight to fourteen years of age.

Fig. 4. Represents a smaller staff fit for boys from about four to eight years of age, but is too large for the smallest children. The staves are made of steel with a groove on the convex side, which serves to direct and receive the point of the knife in cutting, and afterwards to guide the beak of the gorget (*Fig. 6.*) into the bladder. Of these there should be two more sizes, one less than *Fig. 4.* for infants, and one larger than *Fig. 3.* for

TAB. V.





Figure

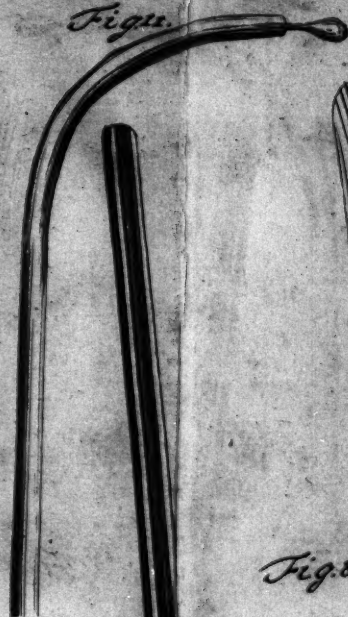


Fig. 8.

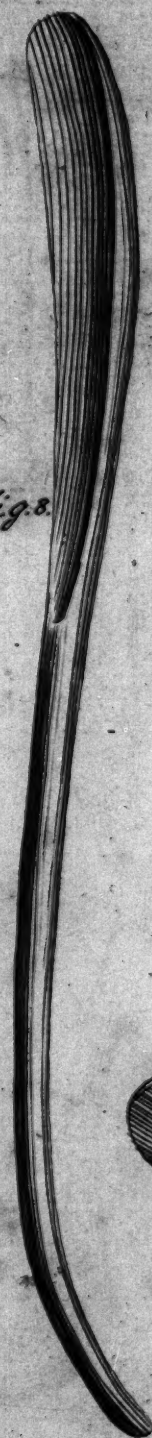
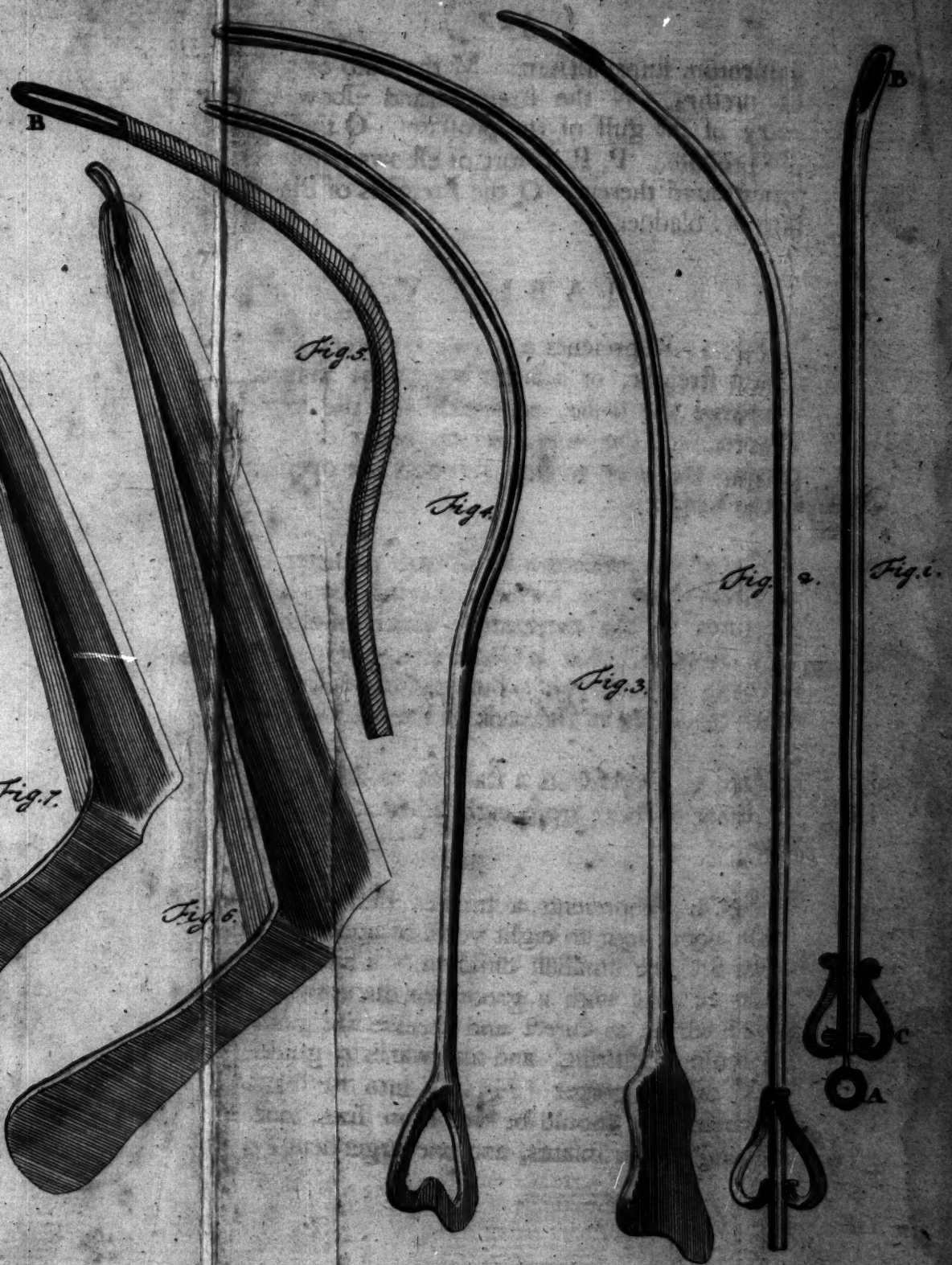


Fig. 7.





...all grow ... the edges of ...
...be smooth and rounding ...
...the incision and the groove ...
...pass through the end of the ...
...not be apt to catch the point of ...

Represents the ball of a ...
...in the shape of that at ...
...of a strong flattened wire, which ...
...into the bladder, supported by the ...
...which it includes, adapts itself ...
...figure of the urethra, so that it may ...
...in the bladder to give ...
...to the urine, and prevent it from ...
...the wound in persons, which is ...
...and very difficult to cure ...

Represents a gorgon for ...
...operation for the stone.

Represents a gorgon for children ...
...years of age, and one of a size between ...
...will last for five to fifteen years ...
...these instruments are hollow for the ...
...the forceps into the bladder, and their ...
...that they may the more readily ...
...through the wound in the prostate ...
...obliquely on the side of it ...
...the extremity of the gorgon must be ...
...groove of the staff which ...
...to be received into the g ...
...should be taken that the edges of the ...
...the peak is not sharp, lest it ...
...the wound, as it ought, it should on ...
...side when introduced, in which ...

for men full grown. The edges of the grooves should be smooth and rounding, that they may not cut the urethra; and the groove should be continued quite through the end of the staff, that it may not be apt to catch the point of the gorget.

Fig. 5. Represents the half of a flexible catheter made in the shape of that at *Fig. 2.* only composed of a strong flattened wire, which being introduced into the bladder, supported by the strong silver wire which it includes, adapts itself easily to the figure of the urethra, so that it may be left a considerable time in the bladder to give a discharge to the urine, and prevent it from escaping through the wound in perinæo, which is apt to become callous, and very difficult to cure from that cause.

Fig. 6. Represents a gorget fit for men in the lateral operation for the stone.

Fig. 7. Denotes a gorget for children under five years of age; and one of a size betwixt these two will suit boys from five to fifteen years of age. These instruments are hollow for the passage of the forceps into the bladder, and their handles lie slanting, that they may the more readily be carried through the wound of the prostate, which is made obliquely on the left side of it. The beak at the extremity of the gorget must be smaller than the groove of the staff which is cut upon, because it is to be received into the groove. Care should be taken that the edges of the gorget near the beak are not sharp, lest instead of dilating the wound, as it ought, it should only cut on each side when introduced; in which case it

would be difficult to carry the forceps into the bladder.

Fig. 8. Represents a steel scoop to extract the stone when it is broke into small fragments: the small end serving to search for a stone in the bladder through the wound which is made into it.

Fig. 9. Denotes a steel director to conduct the gorget through the urethra in extracting the stone from women with or without cutting.

Fig. 10. Represents a pair of stone forceps, of which there should be several sizes agreeable to the age and stone to be extracted: and therefore there should be four or five from the size of that in the table to about a foot long. *Mr. Sharp* observes of these forceps, that they ought to be made so as not to meet close at the extremities when they are shut; that the teeth should not be so large as to break the stone, nor seated too near the hinge, which should be made to move freely.

Fig. 11. Represents half a catheter without lateral apertures at the extremity, as in *Fig. 2.* having only a circular opening at the end, which is shut up in the introduction of it by the globular button of the included wire, which is never extracted in this instrument as it is in the others (*Fig. 1, 2.*); but when it is passed into the bladder, the wire is thrust forward, by which means the button is removed from the extremity, and a free passage is made for the urine. This is said to pass more easily through the urethra without wounding or catching against its sides.

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